EPA United States Environmental Protection Agency

Office of Pollution Prevention and Toxics Washington, DC 20460

January 1999
EPA 745-B-99-006

EPCRA Section 313 Industry Guidance

PETROLEUM TERMINALS AND BULK STORAGE FACILITIES

TRI

Section 313 of the Emergency Planning and Community Right-to-Know Act

Toxic Chemical Release Inventory

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TABLE OF CONTENTS

OVERVIEW iii
Acknowledgment v

Chapter 1 - Introduction 1-1

1.0 PURPOSE 1-1
1.1 Background on EPCRA 1-2

Chapter 2 - Reporting Requirements 2-1

2.0 PURPOSE 2-1
2.1 Must You Report? 2-1
2.2 Definition of "Facility" 2-3
2.3 SIC Code Determination 2-4
2.4 Number of Employees 2-7
2.5 Manufacturing, Processing, and Otherwise Use of EPCRA Section 313 Chemicals 2-10
2.6 Activity Thresholds 2-11
2.7 How Do You Report? 2-13
2.8 Form R 2-13
2.9 Form A 2-14
2.10 Trade Secrets 2-15
2.11 Recordkeeping 2-15

Chapter 3 - EPCRA Section 313 Threshold Determinations 3-1

3.0 PURPOSE 3-1
3.1 Step 1 - Determining which EPCRA Section 313 chemicals are manufactured (including imported), processed, or otherwise used 3-1
3.2 Step 2. Determining the quantity of each EPCRA Section 313 chemical manufactured (including imported), processed, or otherwise used 3-7
3.2.1 Concentration Ranges for Threshold Determination 3-19
3.2.2 Evaluation of Exemptions 3-21
3.2.2.1 Laboratory Activities Exemption 3-21
3.2.2.2 *De Minimis* Exemption 3-22
3.2.2.3 Article Exemption 3-23
3.2.2.4 Exemptions that Apply to the Otherwise Use of EPCRA Section 313 Chemicals 3-24
3.2.3 Additional Guidance on Threshold Calculations for Certain Activities 3-27
3.2.3.1 On-site Reuse Activities 3-27
3.2.3.2 Remediation Activities 3-27
3.3 Step 3. Determine which EPCRA Section 313 chemicals exceed a threshold 3-27

Chapter 4 - Estimating Releases and Other Waste Management Quantities 4-1

4.0 PURPOSE 4-1
4.1 General Steps for Determining Releases and Other Waste Management Activities 4-3
4.1.1 Step 1: Identify Potential Sources of Chemical Release and Other Waste Management Activities 4-3
4.1.2 Step 2: Prepare a Process Flow Diagram 4-5
4.1.3 Step 3: Identify On-Site Releases, Off-Site Transfers and On-Site Waste Management Activity Types 4-5
4.1.4 Step 4: Determine the Most Appropriate Method(s) to Develop the Estimates for Releases and Other Waste Management Activity Quantities and Calculate the Estimates 4-16
4.1.4.1 Monitoring Data or Direct Measurement (code M) 4-17
4.1.4.2 Mass Balance (code C) 4-18
4.1.4.3 Emissions Factors (code E) 4-19
4.1.4.4 Engineering Calculations (code O) 4-20
4.1.4.5 Estimating Releases and Other Waste Management Quantities 4-21
4.1.5 Other Form R Elements 4-24
4.1.5.1 Maximum Amount On-Site (Part II, Section 4.1 of Form R) . 4-24
4.1.5.2 Production Ratio or Activity Index (Part II, Section 8.9 of Form R) 4-24
4.1.5.3 Source Reduction (Part II, Sections 8.10 and 8.11 of Form R) 4-25
4.2 Calculating Release and Other Waste Management Estimates at Petroleum Bulk Storage Facilities 4-26
4.2.1 Fugitive Air Emissions, Section 5.1 of Form R 4-27
4.2.2 Stack or Point Source Air Emissions, Section 5.2 of Form R. 4-33
4.2.3 Discharges to Receiving Streams or Water Bodies, Section 5.3 of Form R; and Discharges to Publicly Owned Treatment Works (POTWs), Section 6.1 of Form R 4-34
4.2.4 Disposal to Land On-site, Section 5.5 of Form R 4-38
4.2.5 Transfers Off-site, Section 6.2 of Form R. 4-39
4.2.6 On-site Waste Management Methods, Section 7A, 7B, and 7C of Form R 4-39
4.2.7 Source Reduction and Recycling Activities, Section 8 4-40
4.2.8 Source Reduction Activities, Section 8.10 4-41

Appendix A A-1

OVERVIEW

On May 1, 1997, the U.S. Environmental Protection Agency (EPA) promulgated a final rule (62 FR 23834) adding several new industrial sectors to the list of facilities subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) Section 313 reporting requirements. Facilities affected by this rule are subject to the annual reporting requirements beginning with activities conducted during the 1998 calendar year, with their first reports due by July 1, 1999.

This document supersedes the document entitled *Section 313 Emergency Planning and Community Right-to-Know Act, Guidance for Petroleum Bulk Facilities,* dated October 1997. It is intended to assist establishments and facilities designated by Standard Industrial Classification (SIC) code 5171 (petroleum bulk stations and terminals) in making compliance determinations under the EPCRA Section 313 reporting requirements and preparing Form R(s) or the Form A certification statement(s) as required. The EPCRA Section 313 program is commonly referred to as the Toxic Chemical Release Inventory (TRI) program.

The principal differences in the new document include the following:

- More detailed examples;
- Additional interpretive guidance prepared by EPA on various issues specific to petroleum bulk storage facilities;
- Industry process issues not discussed in the earlier document; and
- General format changes for program consistency.

This document is designed to be a supplement to the *Toxic Chemical Release Inventory Reporting Forms and Instructions (TRI Forms and Instructions)*, issued annually. It is organized to provide a step-by-step guide to compliance with EPCRA Section 313, starting with how you determine if your facility must report through completion of the Form R or Form A. While certain information provided in this document may be used as a reference, specific information available to facilities, such as amounts of chemicals in mixtures and other trade name products used at the facility, may be more accurate and more appropriate for use in developing threshold determinations and estimating releases and other waste management amounts. Under EPCRA Section 313, facilities are instructed to use the best "readily available data" or when such data are not available, "reasonable estimates", in fulfilling their reporting requirements. This document is organized in the following manner.

Chapter 1 serves as an introduction to TRI reporting and provides a brief background on the Emergency Planning and Community Right-to-Know Act and information on where to obtain additional compliance assistance.

Chapter 2 begins with how to determine if your facility must report. This determination is based on your answers to a series of four questions:

1. Is your facility's primary SIC code on the EPCRA Section 313 list?

2. Does your facility employ ten or more full time equivalent employees?

3. Does your facility manufacture, process, or otherwise use any EPCRA Section 313 chemicals?

4. Does your facility exceed any of the activity thresholds for an EPCRA Section 313 chemical?

If the answer to ANY ONE of the four questions above is "No" you are not required to submit an EPCRA Section 313 report. If you answer "Yes" to ALL four questions, the next step is determining which form(s), Form R or Form A, your facility should file. Chapter 2 provides detailed information on the requirements for each kind of submission.

Chapter 2 concludes with a discussion on how you address trade secrets in your reporting and the kinds of records you should be keeping to support your reporting.

Chapter 3 discusses how you calculate the activity thresholds (manufacture, process, and otherwise use) for the EPCRA Section 313 chemicals. Information is provided on how you determine which EPCRA Section 313 chemicals your facility manufactures, processes, or otherwise uses and how you calculate the quantities of each. Detailed information is also provided on the various exemptions.

Chapter 3 concludes with a discussion of how to determine which EPCRA Section 313 chemicals exceed a reporting threshold, including focused discussions on issues specific to petroleum bulk storage facilities .

Chapter 4 discusses how you calculate the release and other waste management amounts for those EPCRA Section 313 chemicals for which you must prepare a report. This chapter provides a step-by-step approach designed to minimize the risk of overlooking an activity involving an EPCRA Section 313 chemical and any potential sources or types of releases and other waste management activities that your facility may conduct. This procedure consists of the following steps:

- Identification of potential **sources** of EPCRA Section 313 chemicals released and otherwise managed as wastes;
- Preparation of a detailed **process flow diagram**;
- Identification of the potential **types** of releases and other waste management activities from each source; and
- Determination of the most appropriate methods for **estimating the quantities** of listed EPCRA Section 313 chemical releases and other waste management activities.

The main part of Chapter 4 is organized around activities common to petroleum bulk storage facilities where EPCRA Section 313 chemicals are manufactured, processed, or otherwise used. A list of EPCRA Section 313 chemicals likely to be managed by petroleum bulk storage facilities; process descriptions; guidance on thresholds determinations; release and other waste management estimation techniques; and problems these types of facilities are likely to face in complying with EPCRA Section 313 are also presented in this chapter.

This document includes examples of chemical management activities that petroleum bulk storage facilities may conduct, illustrating how these activities should be considered for EPCRA Section 313 reporting purposes. This chapter also notes areas where potential errors in reporting might be encountered generally by petroleum bulk storage facilities, which are based on information from written comments received from industry representatives as well as from comments made by participants in EPA-sponsored EPCRA workshops.

ACKNOWLEDGMENT

EPA would like to recognize the valuable contributions made by the staff at the Petroleum Transportation and Storage Association (PTSA), whose industry insight and understanding of EPCRA Section 313 requirements have greatly assisted in increasing the utility of this document. Special thanks go to Mark Morgan, Executive Director of PTSA.

Chapter 1 - Introduction

1.0 PURPOSE

The purpose of this guidance document is to assist petroleum bulk storage facilities in SIC code 5171 to comply with the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and of Section 6607 of the Pollution Prevention Act of 1990 (PPA), commonly referred to as the Toxic Release Inventory (TRI). On May 1, 1997, EPA promulgated a rule (62 FR 23834) to require petroleum bulk storage facilities, along with other industry groups, to be included on the list of facilities subject to the EPCRA Section 313 reporting requirements. The new facilities are subject to annual reporting requirements beginning with activities occurring in the 1998 calendar year, with the first reports due by July 1, 1999.

This document explains the EPCRA Section 313 and PPA Section 6607 reporting requirements (collectively referred to as the EPCRA Section 313 reporting requirements) and discusses specific release and other waste management activities encountered at many facilities in this industry. Because each facility is unique, the recommendations presented may have to be adjusted to the specific nature of operations at your facility.

This document supersedes the document entitled *Section 313 Emergency Planning and Community Right-to-Know Act, Guidance for Petroleum Bulk Storage Facilities*, dated October 1997.

The document is intended to supplement the *Toxic Chemical Release Inventory Reporting Forms and Instructions (TRI Forms and Instructions)* document which is updated and published annually by the U.S. Environmental Protection Agency (EPA). It is essential that you use the most current version of the *TRI Forms and Instructions* to determine whether (and how) you should report. Changes or modifications to TRI reporting requirements are reflected in the annual *TRI Forms and Instructions* and should be reviewed before compiling information for the report.

The objectives of this manual are to:

- Clarify EPCRA Section 313 requirements for industry;
- Increase the accuracy and completeness of the data being reported by petroleum bulk storage facilities; and
- Reduce the level of effort expended by those facilities that prepare an EPCRA Section 313 report.

While it is not possible to anticipate every potential issue or question that may apply to your facility, this document attempts to address those issues most prevalent or common to petroleum bulk storage facilities. Facilities should also rely on EPA's *Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form* document to assist in providing complete and accurate information for EPCRA Section 313 reporting. Additional discussion addressing specific issues can be found in EPA's current version of *EPCRA Section 313 Questions and Answers*. All of these documents are available on the EPA's TRI

website (http://www.epa.gov/opptintr/tri) or by contacting the EPCRA Hotline at 1-800-424-9346. In the Washington, DC metropolitan area, call 703-412-9810. The EPCRA Hotline TDD number is 1-800-553-7672, or in the Washington, D.C. metropolitan area, call 703-412-3323.

1.1 Background on EPCRA

One of EPCRA's primary goals is to increase the public's knowledge of, and access to, information on both the presence and release and other waste management activities of EPCRA Section 313 chemicals in their communities. Under EPCRA Section 313, certain facilities (see SIC code discussion, Chapter 2.3) exceeding certain thresholds (see Chapter 2.5) are required to submit reports (commonly referred to as Form Rs or Form A certification statements) annually for over 600 EPCRA Section 313 chemicals and chemical thresholds and the amounts that enter an environmental medium or are otherwise managed as waste, even if there are no releases and other waste management quantities associated with these chemicals. Chemicals are considered by EPA for inclusion on the EPCRA Section 313 list based on their potential for acute health effects, chronic health effects, and environmental effects. Chemicals may be added or deleted from the list. Therefore, before completing your annual report, be sure to check the most current list included with the *TRI Forms and Instructions* when evaluating the chemicals managed at your facility. Copies of the reporting package can be requested from the EPCRA Hotline, as indicated above, or from the Internet at http://www.epa.gov/opptintr/tri/report.htm.

All facilities meeting the EPCRA Section 313 reporting criteria must submit either a Form R or Form A. A separate submission is required for each EPCRA Section 313 chemical or chemical category that is manufactured (including imported), processed, or otherwise used above the reporting threshold. Reports must be submitted to EPA and State or Tribal governments, on or before July 1, for activities in the previous calendar year. The owner/operator of the facility on July 1 of the reporting deadline is primarily responsible for the report, even if the owner/operator did not own the facility during the reporting year. However, property owners with no business interest in the operation of the facility, for example, owners of an industrial park who only have a real estate interest, are not responsible for any reporting requirements.

EPCRA also mandates that EPA establish and maintain a publicly available database consisting of the information reported under Section 313, and applicable PPA information. This database, known as the Toxic Chemical Release Inventory (TRI), can be accessed through the following sources:

- National Library of Medicine (NLM) TOXNET on-line system;
- EPA's Internet site, http://www.epa.gov/opptintr/tri;
- Envirofacts Warehouse Internet site, http://www.epa.gov/enviro/tris-overview.html;
- CD-ROM from the Government Printing Office (GPO);
- Microfiche in public libraries;
- Magnetic tape and diskettes from the National Technical Information Service; and
- EPA's annual TRI data release materials (summary information).

In addition to being a resource for the public, TRI is also used in the research and development of regulations related to EPCRA Section 313 chemicals.

Alternative Submission (Form A)

To reduce the burden for facilities that must comply with EPCRA Section 313, EPA has established an alternate threshold of one million pounds manufactured, processed, or otherwise used for facilities with total annual reportable amounts of 500 pounds or less of the EPCRA Section 313 chemical. Provided the facility does not exceed either the reportable amount or the alternate threshold, the facility may file a certification form (Form A) rather than a Form R. By filing the Form A, the facility certifies that it did not exceed the reportable amount or exceed the alternate threshold. (See Chapter 2.9 for more detail.)

Note that the annual reportable amount includes the quantity of EPCRA Section 313 chemicals in all production-related waste management activities, not just releases (see the waste management discussion in Chapter 4 for more detail). Also, a covered facility must submit either a Form A or a Form R for each EPCRA Section 313 chemical exceeding an applicable reporting threshold, even if there are no releases and other waste management quantities.

Enforcement

Violation of Section 313 reporting provisions may result in federal civil penalties of up to $27,500 per day. State enforcement provisions may also be applicable depending on the state's adoption of any "EPCRA Section 313-like" reporting regulations.

Regulatory Assistance Resources

The *TRI Forms and Instructions* also contain a discussion of common problems in completing the Form R. You are encouraged to read this section before filling out the Form R (or Form A) for your facility. If, after reading both the *TRI Forms and Instructions* and this guidance document, you still have questions about EPCRA Section 313 reporting, please contact the EPCRA Hotline at 1-800-424-9346. Assistance is also available from the designated EPCRA Section 313 Coordinator in the EPA regional office and the EPCRA contact in your state (see the *TRI Forms and Instructions* for a current list of these contacts). Appendix C contains a list of additional reference sources.

Chapter 2 - Reporting Requirements

2.0 PURPOSE

The purpose of this chapter is to help you determine whether you must prepare an EPCRA Section 313 submission(s) and, if so, what kind of a submission(s) you should prepare (Form R or Form A). This chapter presents the EPCRA Section 313 reporting requirements to help you determine whether these requirements apply to your facility. It also discusses the records that you must keep. The following terms and concepts are described in this chapter to help you understand the scope of Section 313 reporting and determine whether you need to report, including:

- Definition of facility;
- SIC code determination;
- Employee determination;
- Definitions of manufacture, process, and otherwise use; and
- Determination of whether you exceed one of the thresholds.

2.1 Must You Report?

How do you determine if your facility must prepare an EPCRA Section 313 report? This is decided by your answers to the following four questions (illustrated by Figure 2-1):

1) Is the primary SIC code(s) for your facility included in the list covered by EPCRA Section 313 reporting (see Chapter 2.3)?

2) Does your facility employ 10 or more full time employees or the equivalent (see Chapter 2.4)?

3) Does your facility manufacture (which includes importation), process (which includes repackaging), or otherwise use EPCRA Section 313 chemicals (see Chapter 2.5)?

4) Does your facility exceed any applicable thresholds of EPCRA Section 313 chemicals (25,000 pounds per year for manufacturing; 25,000 pounds per year for processing (see Table 3-5 for threshold determinations based on gallonage); or 10,000 pounds per year for otherwise use - see Chapter 3)?

If you answered "No" to any of the four questions above, you are not required to prepare any submissions under EPCRA Section 313. If you answered "Yes" to ALL of the first three questions, you must perform a threshold determination for each EPCRA Section 313 chemical at the facility, and submit a Form R **or** Form A for each chemical exceeding a threshold.

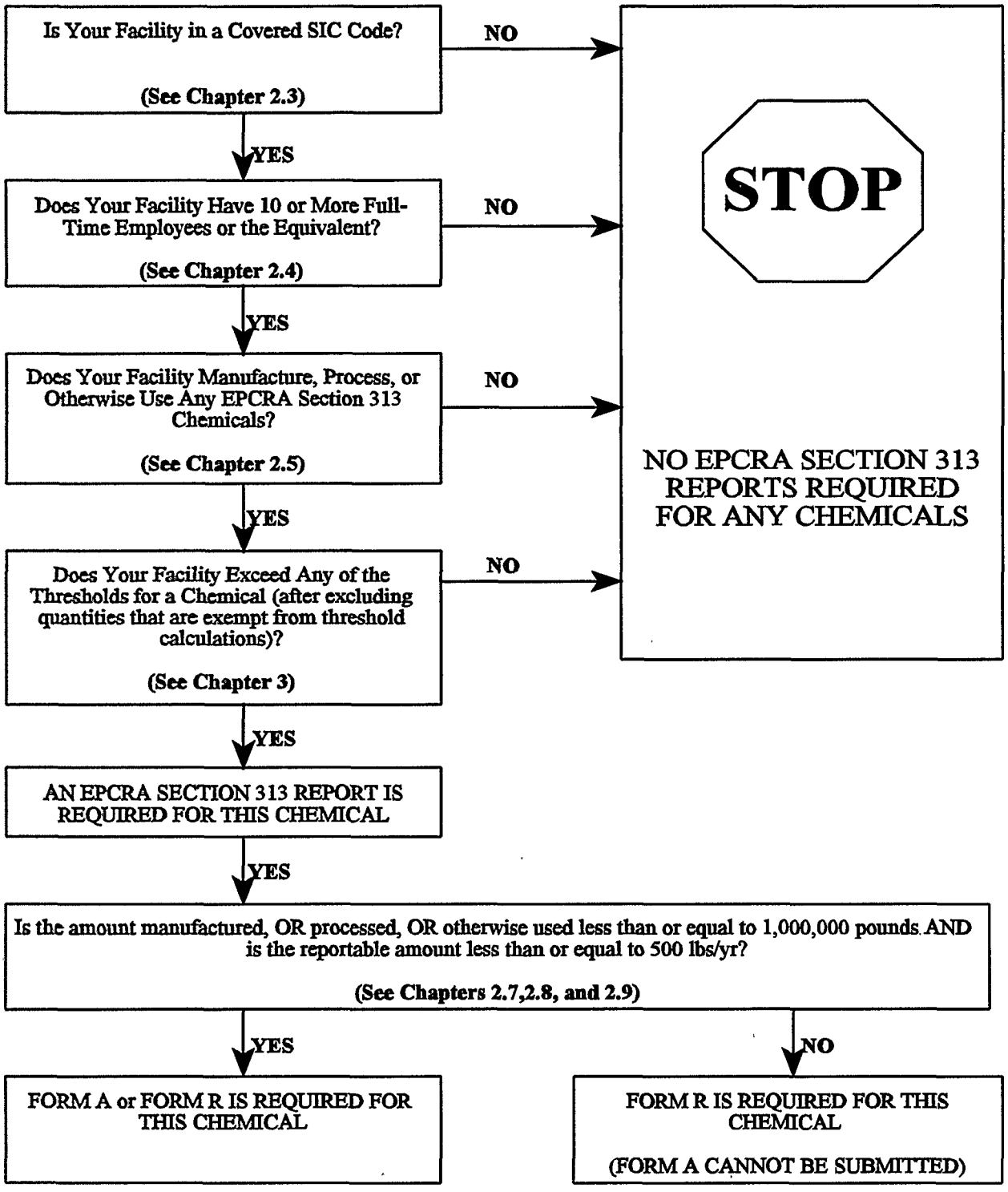

Figure 2-1. TRI Reporting Determination Diagram

2.2 Definition of "Facility"

To understand the applicability of EPCRA Section 313, you must first understand how EPCRA defines a facility. The term "facility" is defined as "all buildings, equipment, structures and other stationary items which are located on a single site or on contiguous or adjacent sites and which are owned or operated by the same person (or by any person which controls, is controlled by, or is under common control with such person). A facility may contain more than one establishment" (40 CFR 372.3). An "establishment" is defined as "an economic unit, generally at a single physical location, where business is conducted, or services or industrial operations are performed" (40 CFR 372.3).

EPA recognizes that some facilities have unique and separate activities ("establishments") taking place at the same facility, and for some of these facilities it may be easier and more appropriate for individual establishments to manage their chemical usage and management information separately. EPA provides for these cases and allows individual establishments at the same facility to report separately. However, for threshold determinations, quantities of EPCRA Section 313 chemicals manufactured, processed, or otherwise used in all establishments in that facility must be combined and considered together. Also, the combined releases and other waste management activities reported separately for each establishment must equal those for the facility as a whole.

Example - Multiple Establishments

Your facility has several different establishments, all with SIC codes covered by EPCRA Section 313. One establishment repackaged and distributed into commerce oil product containing 20,000 pounds of an EPCRA Section 313 chemical during the year. Another establishment blended 7,000 pounds of the same chemical in a fuel blending process during the same year. Both activities constitute "processing" of the EPCRA Section 313 chemical (as presented in Section 2.5 and described in detail in Chapter 3) and the total quantity processed at the facility exceeded the 25,000 pound processing threshold for the year. If your facility meets the employee threshold, you must file a Form R for that chemical. EPA allows multi-establishment facilities to submit Form Rs from each establishment for an EPCRA Section 313 chemical when thresholds have been exceeded at the facility level. Please note that Form A eligibility is also made at the facility-level, but only one Form A can be submitted per chemical for the entire facility.

Contiguous and/or Adjacent Facilities. In defining the parameters of your facility, you must consider all buildings and other stationary items located on multiple contiguous or adjacent sites that are owned or operated by the same person for EPCRA reporting purposes. For example, an industrial park could contain a manufacturing company and a solvent recovery operation, both operated independently, but owned by the same parent company. Since the two establishments are contiguous or adjacent to each other, they are considered one "facility." The amount of each EPCRA Section 313 chemical manufactured, processed, or otherwise used and the number of employees must be aggregated for all of these contiguous or adjacent sites to determine whether the entire facility meets reporting thresholds. If a company's operations are carried out at two distinctly separate, physical sites that are not contiguous or adjacent, that company is operating two separate facilities for the purposes of EPCRA reporting. The company, therefore, must make SIC code, employee, threshold determinations, and if appropriate, release and other waste management estimates individually for each facility.

If two establishments owned or operated by the same company are connected to each other by a piece of property that is owned by one of the establishments or the same parent corporation, or if they are separated by an easement (e.g., railroad tracks, public road, public catchment basin), they are still considered to be contiguous or adjacent and are therefore part of the same facility. Both "establishments" may report together as the same facility or they may report separately provided threshold determinations are based on activities at the entire facility and that the sum of the releases of the establishments reflects the total releases of the whole facility. Facility operations that are not connected to each other by a piece of property, that is commonly owned, controlled, or operated by the same person(s), are not considered contiguous and may be considered two separate facilities. However, if these operations are relatively near each other, they may be considered adjacent; in which case, they would be part of the same facility.

Example - Separate Facilities

Two covered bulk petroleum stations owned by the same parent company are connected to each other by a pipeline some distance apart from each other. The parent company controls the easement of the pipeline but the land on which the pipeline rests is not owned by the parent company. For the purposes of reporting on the Form R, are the two stations considered two separate facilities?

Yes. Since the two bulk petroleum stations are not contiguous or adjacent properties and are connected only by a pipeline, the two stations are considered two separate facilities with the same owner, even though the parent company controls the easement on which the pipeline is located.

2.3 SIC Code Determination

Facilities with the SIC codes presented in Table 2-1 are covered by the EPCRA Section 313 reporting requirements. For assistance in determining which SIC code best suits your facility, refer to *Standard Industrial Classification Manual, 1987,* published by the Office of Management and Budget.

Table 2-1
SIC Codes Covered by EPCRA Section 313 Reporting

SIC Code Industry Sectors		
SIC Codes	**Industry**	**Qualifiers**
10	Metal Mining	Except SIC codes 1011, 1081, and 1094
12	Coal Mining	Except SIC code 1241
20 through 39	Manufacturing	None
4911, 4931, and 4939	Electric and Other Services and Combination Utilities	Limited to facilities that combust coal and/or oil for the purpose of generating electricity for distribution in commerce
4953	Refuse Systems	Limited to facilities regulated under RCRA Subtitle C
5169	Chemicals and Allied Products	None
5171	**Petroleum Bulk Stations and Terminals**	**None**
7389	Business Services	Limited to facilities primarily engaged in solvent recovery services on a contract or fee basis

While you are currently required to determine your facility's reporting eligibility based on the SIC code system described above, it is important to be aware that the SIC code system will be replaced by a new system in the future. On April 9, 1997 (62 FR 17287), the Office of Management and Budget promulgated the North American Industrial Classification System (NAICS). NAICS is a new economic classification system that replaces the SIC code system as a means of classifying economic activities for economic forecasting and statistical purposes. The transition to the new NAICS may require statutory and/or regulatory actions. As a result, the SIC code system is still required to be used as the mechanism to determine your facility's reporting eligibility. EPA will issue notice in the *Federal Register* to inform you and other EPCRA Section 313 facilities of its plans to adopt the NAICS and how facilities should make their NAICS code determination.

Example - SIC Code Determination

Many bulk petroleum stations operating in some Midwestern states sell their petroleum products directly to end users. These plants typically sell to farmers and construction companies, as well as state and local governments. Generally, the products are transferred to the customer in quantities of 500 gallons or less. For these facilities, distribution to retail facilities may make up approximately 5 percent of their overall business. Are these facilities considered bulk wholesale distributors of petroleum products, or are they more appropriately classified in retail trade and therefore not covered under EPCRA Section 313?

Based on these facts, the facilities are properly classified in SIC code 5171 (bulk petroleum stations and terminals) and not SIC code 5541(gasoline service stations). Therefore, these facilities must comply with the reporting requirements of EPCRA Section 313. According to the *SIC Code Manual* (1987 ed) "...establishments or places of business primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, farm, construction contractors, or professional business users; or other wholesalers; or acting as agents or brokers in buying or selling merchandise to such persons or companies" are properly classified in Division F, Wholesale Trade, SIC code 5171, and are therefore covered under EPCRA Section 313, beginning with the reporting year 1998.

Primary SIC Code Determination. Assuming your facility has several establishments with different SIC codes that are owned or operated by the same entity, you will need to determine if your facility has a primary SIC code that is subject to EPCRA Section 313. Your facility is subject to EPCRA Section 313 reporting requirements if:

- All the establishments have SIC codes covered by EPCRA Section 313; OR
- The total value of the products shipped or services provided at establishments with covered SIC codes is greater than 50% of the value of the entire facility's products and services; OR
- Any one of the establishments with a covered SIC code ships and/or produces products or provides services whose value exceeds the value of services provided or products produced and/or shipped by all of the other establishments within the facility on an individual basis.

Example - Primary SIC Code

A facility is made up of two establishments. The first establishment, a petroleum bulk storage operation, which has 100,000 gallons of storage capacity, is in SIC code 5171 and is regulated under EPCRA Section 313. The second establishment, a petroleum products wholesaler, in SIC code 5172, is not within an SIC code covered by EPCRA Section 313. The facility then determines that the value added by the petroleum products wholesaler is worth $500,000/year whereas the value of the petroleum bulk storage operation is $1,500,000/year. The value of the covered establishment is more than 50% of the facility's value; therefore, the primary SIC code determination is such that the entire facility is subject to EPCRA Section 313 reporting.

POSSIBLE ERROR - Multi-Establishment Facilities

In the above example, the "multi-establishment" facility should not overlook the EPCRA Section 313 chemicals in the petroleum products at the petroleum products wholesaler operations. Once your facility meets the SIC code and employee threshold criteria, facility personnel are required to consider all non-exempt activities in all establishments in its threshold and release and other waste management calculations.

To determine the value of production or service attributable to a particular establishment, you can subtract the product or service value obtained from other establishments from the total product or service value of the facility. This procedure eliminates the potential for "double counting" production or service in situations where establishments are engaged in sequential production activities at a single facility.

Auxiliary Facilities Some companies may own and/or operate a non-contiguous and non-adjacent facility that primarily supports a covered EPCRA Section 313 facility. These auxiliary facilities assume the SIC code of a covered facility that it directly supports. For example, an off-site warehouse that directly supports a covered petroleum bulk terminal (SIC code 5171) must assume the SIC code 5171 itself. For the purposes of EPCRA Section 313, auxiliary facilities must be engaged in performing support services for another facility or establishment within a covered facility. Therefore, if an auxiliary facility's primary function is to support/service a covered petroleum bulk storage facility, the auxiliary facility may assume the SIC code of the main facility and may then be covered by the EPCRA Section 313 reporting requirements for purposes of the facility's SIC code.

Example - Auxiliary Facilities

A retail gas station sells only products supplied by one covered bulk petroleum station. Is the retail gas station considered an auxiliary facility and therefore does it take on the covered SIC code of the bulk petroleum station?

No. While the retail gas station sells only products supplied by the covered bulk petroleum station it is not an auxiliary facility because it does not support the operation of the bulk petroleum station (i.e., the retail sale of gasoline and other petroleum products is a distinctly separate activity that benefits the gas station as opposed to benefitting the bulk petroleum station). An auxiliary facility is one that supports another facility's activities. An auxiliary facility can assume the SIC code of another covered facility if its primary function is to serve that other covered facility's operations.

2.4 Number of Employees

Facilities must also meet or exceed the 10 or more full-time employees or equivalent criterion to be subject to EPCRA Section 313 reporting requirements. A full-time employee equivalent is defined as a work year of 2,000 hours. If your facility's staff (including contractors and certain other non-company personnel) work 20,000 or more hours in a calendar year, you meet the 10 or more full-time employee criterion. While many facilities may easily exceed this criterion, your facility may be small or highly automated and your on-site staff may be small. In these cases, in particular, you should carefully consider all personnel supporting your operations,

including other operations at establishments at the facility, to determine if you meet the 10 or more full-time employee criterion.

If you have determined that your facility is covered and it is made up of multiple establishments, you must include the hours worked by employees in all establishments for the overall facility's employee threshold. For example, if your petroleum bulk terminal also has a retail gas service station and convenience store on-site, and you have determined that the primary SIC code of the facility is 5171, then the hours worked by employees at the gasoline service station and convenience store must be included in the "facility's" employee hour calculation when considering if the employee threshold has been exceeded.

Hours worked by employees who happen to be on-site who directly support another facility do not have to be counted at the facility where they are "temporarily" located, such as a sales representative supporting other facilities, provided that the facility can demonstrate through time keeping records that the time worked by such an employee was in support of another facility.

The following personnel and time should be included in your employee calculations:

- Owners working at the facility;
- Operations staff;
- Clerical staff;
- Temporary employees;
- Sales personnel;
- Truck drivers (employed by the facility);
- Other off-site facility employees directly supporting the facility;
- Paid vacation and sick leave; and
- Contractor employees (excluding contract truck drivers).

In general, if an individual is employed or hired to work at the facility, all the hours worked by that individual must be counted in determining if the 20,000 hour criterion has been met.

Example - Calculating Employees

Your facility has six full-time employees working 2,000 hours/year in the plant bulk terminal operation. There are also three full-time truck drivers (employed by the facility) assigned to the plant, each working 2,000 hours/year but predominantly on the road. You built an addition to the tank farm during the year, using four contractor personnel who were on site full time for six months (working an average of 1,000 hours each). You would calculate the number of full-time employee equivalents as follows:

- Hours for your nine full-time employees (six plant personnel and three truck drivers) for the year are:

  9 employees x 2,000 hours/year = 18,000 hours;

- Hours for the construction crew are:

  4 contractors x 1,000 hours = 4,000 hours.

This is a total of 22,000 hours for the year, which is above the 20,000 hours/year threshold; therefore, you meet the employee criterion.

POSSIBLE ERROR - Construction Workers and Maintenance Service Contractors

Remember to include construction workers and maintenance service contractors in your employee threshold calculation.

Example - Truck Jobbers

A petroleum bulk terminal contracts with truck jobbers who purchase its petroleum products. The terminal has no direct control over the activities of the truck drivers. Are the hours worked by these jobbers and their drivers at the petroleum terminal counted towards the terminal's employee threshold calculation?

No. The hours worked by the truck jobbers do not directly support the terminal. The jobbers purchase the petroleum products and function as customers to the terminal. The terminal has processed the petroleum product at the point that the jobbers take possession of the petroleum products.

2.5 Manufacturing, Processing, and Otherwise Use of EPCRA Section 313 Chemicals

If you have determined that your facility meets the SIC code and employee threshold determinations, you must determine what EPCRA Section 313 chemicals are manufactured, processed, or otherwise used at your facility during the reporting year and whether an activity threshold was exceeded. This section of the chapter will introduce the terms and concepts behind this determination; whereas, Chapter 3 will take you through a detailed step-by-step process to determine whether you need to report for any EPCRA Section 313 chemicals.

Identifying Chemicals. If you are in a covered SIC code and have 10 or more full-time employee equivalents, you must determine which EPCRA Section 313 chemicals are manufactured, processed, or otherwise used at your facility in excess of threshold quantities. To assist in doing this, you should prepare a list of all chemicals manufactured, processed, or otherwise used by all establishments at the facility, including the chemicals present in mixtures and other trade name products and managed in wastes received from off-site. This list should then be compared to the CURRENT list of EPCRA Section 313 chemicals found in the *TRI Forms and Instructions* document for that reporting year (available from the EPCRA Hotline, 1-800-424-9346 or at the website: http://www.epa.gov/opptintr/tri). In addition to the individually listed chemicals, the list of EPCRA Section 313 chemicals includes several chemical categories (discussed in detail in Chapter 3). You must include chemical compounds that are members included in any of these categories when evaluating activities at the facility for threshold determinations and release and waste management calculations. Once you identify the EPCRA Section 313 chemicals and chemical categories at your facility, you must evaluate the activities involving each chemical or chemical category and determine whether any activity thresholds have been met.

Note that the chemicals listed under EPCRA Section 313 are periodically added, delisted, or modified. Therefore, it is imperative that you refer to the appropriate reporting year's list. Also, note that a list of synonyms for EPCRA Section 313 chemicals can be found in the EPA publication *Common Synonyms for Chemicals Listed Under Section 313 of the Emergency Planning and Community Right-To-Know Act* (updated March 1995). Table 2-2 lists EPCRA Section 313 chemicals that may be commonly processed or otherwise used at petroleum bulk storage facilities.

Table 2-2
EPCRA Section 313 Chemicals Commonly Processed or Otherwise Used by Petroleum Bulk Storage Facilities

Product	EPCRA Section 313 Chemicals Likely to be Present Above *De minimis* Concentrations
Gasoline	Benzene, ethylbenzene, MTBE, –hexane, toluene, 1,2,4-trimethylbenzene, xylene (mixed isomers)
No. 6 Fuel Oil	(PACs)
Crude Oil	Benzene, n-hexane, xylene (mixed isomers)
No. 2 Fuel Oil/Diesel Fuel	n-Hexane, 1,2,4-trimethylbenzene
Lubricating Oils	Zinc compounds
Kerosene	Toluene
Aviation Gas	Benzene, toluene, xylene (mixed isomers)
Jet Fuel (JP-4)	Benzene, cyclohexane, n-hexane, toluene, xylene (mixed isomers)
Solvents	n-Butyl alcohol, dichloromethane, –hexane, phosphoric acid, cyclohexane, and tert-butyl alcohol
Cleaning/ Disinfectant Uses	Chlorine, chlorine dioxide, formaldehyde, nitric acid, phosphoric acid, and 1,1,1-trichloroethane

2.6 Activity Thresholds

There are three activity thresholds for the EPCRA Section 313 chemicals defined in EPCRA Section 313: manufacturing (which includes importing), processing, and otherwise use. The activity thresholds are 25,000 pounds per year for manufacturing, 25,000 pounds per year for processing, and 10,000 pounds per year for otherwise use. These thresholds apply to each chemical individually. The determination is based solely on the quantity actually manufactured (including imported), processed, or otherwise used. Only the amounts of the listed EPCRA Section 313 chemical that meet activity definitions are considered towards threshold determinations. Any other amounts not considered to be manufactured, processed, or otherwise used are not considered toward threshold determinations. For example, EPCRA Section 313 chemicals that are brought on-site (excluding amounts imported) and stored for future use or disposal, but are not incorporated into a product for distribution or are not otherwise used on-site during the reporting year, are NOT considered towards any activity threshold for that reporting year.

More detailed explanations of threshold activities (manufactured, processed, or otherwise used), with examples of each are found in Chapter 3, Tables 3-2, 3-3, and 3-6. These terms are briefly defined in Table 2-3, with a detailed discussion to follow:

Table 2-3
Activity Thresholds

Threshold	Definition	Threshold (lbs/yr)
Manufacture	To produce, prepare, import, or compound an EPCRA Section 313 chemical. "Manufacture" applies to an EPCRA Section 313 chemical that is produced coincidentally during the manufacture, processing, otherwise use, or disposal of another chemical or mixture of chemicals as a byproduct or impurity. Examples would be the production of ammonia or nitrate compounds in a wastewater treatment system or the creation of metal compounds during the combustion of coal.	25,000
Process	The preparation of an EPCRA Section 313 chemical, after its manufacture, for distribution in commerce: (1) In the same form or physical state as, or in a different form or physical state from, that in which it was received by the person so preparing such chemical; or (2) As part of an article containing the EPCRA Section 313 chemical. For example, if you receive a mixture containing an EPCRA Section 313 chemical and package it, including transferring from storage tank to a tank truck, and then distribute it into commerce, this chemical has been processed by your facility.	25,000

Threshold	Definition	Threshold (lbs/yr)
Otherwise Use	Generally, use of an EPCRA Section 313 chemical that does not fall under the manufacture or process definitions is classified as otherwise use. An EPCRA Section 313 chemical that is otherwise used is not intentionally incorporated into a product that is distributed in commerce, but may be used instead as a manufacturing or processing aid (e.g., catalyst), in waste processing, or as a fuel (including waste fuel). For example, methanol used as a cleaning solvent is classified as otherwise used. Otherwise use means "any use of a toxic chemical contained in a mixture or other trade name product or waste, that is not covered by the terms "manufacture" or "process." Otherwise use of an EPCRA Section 313 chemical does not include disposal, stabilization (without subsequent distribution in commerce), or treatment for destruction unless the: 1) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction was received from off-site for the purposes of further waste management; or 2) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction that was manufactured as a result of waste management activities on materials received from off-site for the purposes of further waste management activities."	10,000

There are some activities which do not meet the definitions of manufacture, process, or otherwise use. For instance, storage, relabeling, or redistribution of an EPCRA Section 313 chemical where no repackaging occurs does not constitute manufacturing, processing, or otherwise use of that chemical. This type of activity should not be included in threshold calculations. In addition, transfers of EPCRA Section 313 chemicals in wastes for energy recovery, treatment, or disposal are not considered "distribution into commerce." For example, if you receive an EPCRA Section 313 chemical in waste from off-site and repackage the waste and send it to a landfill off-site, that activity should not be included in threshold determinations.

Also, note that the threshold determinations for the three threshold activities (manufacturing, processing, and otherwise use) are mutually exclusive. That is, you must conduct a separate threshold determination for each threshold activity and if you exceed any threshold, all releases and other waste management activities of EPCRA Section 313 chemicals at the facility must be considered for reporting.

2.7 How Do You Report?

You must file a report (Form R) for each EPCRA Section 313 chemical that exceeds a threshold for manufacturing, OR processing, OR otherwise use (providing you meet the employee and SIC code criteria). As an alternative, you may file a Form A certification statement rather than a Form R if you meet certain criteria as explained in Chapter 2.9. The *TRI Forms and Instructions* contain detailed directions for the preparation and submittal of Form R and Form A for each EPCRA Section 313 chemical for the reporting year. The *TRI Forms and Instructions*

are sent to all facilities which submitted Form Rs or Form As the preceding year. However, if you do not receive a courtesy copy or did not report in the preceding year, then copies of the *TRI Forms and Instructions* can be requested from the EPCRA Hotline (1-800-424-9346) or obtained from EPA's TRI website (http://www.epa.gov/opptintr/tri).

2.8 Form R

If you are submitting a Form R, it is essential that you use the *TRI Forms and Instructions* for the appropriate reporting year. EPA encourages the electronic submittal of the Form R, via the Automated TRI Reporting System (ATRS). Use of the ATRS saves time in data entry and photocopying and reduces errors by means of automated validation procedures. The ATRS produces a certification letter with each validated submission (set of EPCRA Section 313 reports) which provides for an original signature to certify that the submission is accurate and correct. The ATRS is available free of charge from EPA's TRI website at http://www.epa.gov/opptintr/afr.

The ATRS is available in both DOS and Windows versions. More information can be found in the *TRI Forms and Instructions*, EPA's TRI website, or by calling the ATRS User Support Hotline at (703) 816-4434.

Each Form R must consist of two parts:

Part I, Facility Identification Information. This part of the form provides general information to identify the facility, including the name and address of the facility, parent company information, and identification numbers used under reporting regulations. When submitting hard copies of Form R, this part may be photocopied and re-used for each Form R you submit, except for the signature which must be original for each Form R; and

Part II, Chemical Specific Information. This part of the form provides chemical-specific information on the reportable activities, releases, other waste management estimates, and source reduction activities for the reporting year. This must be completed separately for each EPCRA Section 313 chemical or chemical category and not reused year to year even if reporting has not changed.

Submission of incomplete Form Rs may result in an issuance of a Notice of Technical Error (NOTE), Notice of Significant Error (NOSE), or Notice of Non-compliance (NON). See the current *TRI Forms and Instructions* for more detailed information on completing and submitting the Form R. The ATRS has a validation program which helps to identify and eliminate many potential data entry errors.

2.9 Form A

EPA developed the Form A, also referred to as the "Certification Statement," to reduce the annual burden for facilities with lesser amounts of EPCRA Section 313 chemicals released and/or otherwise managed as a waste, applicable beginning reporting year 1995 and beyond (59 FR 61488; November 30, 1994). A facility must meet the following two criteria in order to use a Form A:

- First, the amount of the chemical manufactured, processed, OR otherwise used cannot exceed 1,000,000 pounds. It is important to note that the quantities for each activity are mutually exclusive and must be evaluated independently. If the quantity for any one of the activities exceeds 1,000,000 pounds, a Form A cannot be submitted.

- Second, the total annual reportable amount of the EPCRA Section 313 chemical cannot exceed 500 pounds per year. The "reportable amount" is defined as the sum of the on-site amounts released (including disposal), treated, recycled, and combusted for energy recovery, combined with the sum of the amounts transferred off-site for recycling, energy recovery, treatment, and/or release (including disposal). This total corresponds to the total of data elements, 8.1 through 8.7 in Part II of the Form R (explained in Chapter 4).

Example - Form A Threshold

Provided the combined total annual reportable amount from all activities (the sum of data elements 8.1-8.7 of the Form R) does not exceed 500 pounds, a facility that processes 900,000 pounds of an EPCRA Section 313 chemical and otherwise uses 150,000 pounds of the same EPCRA Section 313 chemical, is eligible to use the Form A because the facility did not exceed the one million pounds for either activity; even though the combined amount managed exceeded one million pounds.

The Form A Certification Statement must be submitted for each eligible EPCRA Section 313 chemical. The information on the Form A is included in the publicly accessible TRI database, however these data are marked to indicate that they represent certification statements rather than Form Rs. Note that separate establishments at a facility cannot submit separate Form As for the same chemical; rather, only one Form A per EPCRA Section 313 chemical can be submitted per facility.

Like the Form R, Form A includes facility identification information. However, no release and other waste management estimations to any media are provided. You must simply certify that the total annual reportable quantity of the chemical or chemicals addressed in the Form A did not exceed 500 pounds and that amounts manufactured, or processed, or otherwise used did not exceed one million pounds. Once a facility has completed estimates to justify the submission of a Form A, there is a considerable time savings in using the Form A especially in subsequent years provided activities related with the chemical do not change significantly. It is strongly recommended that you document your initial rationale and reconfirm it every year to verify that you have not made any modifications to the process that would invalidate the initial rationale supporting submission of a Form A.

2.10 Trade Secrets

EPCRA's trade secrets provision only applies to the EPCRA Section 313 chemical identity. If you submit trade secret information, you must prepare two versions of the substantiation form as prescribed in 40 CFR Part 350, published in the *Federal Register* on July 29, 1988, (53 FR 28801) as well as two versions of the Form R. One set of forms should be "sanitized" (i.e., it should provide a generic name for the EPCRA Section 313 chemical identity). This version will be made available to the public. The second version, the "unsanitized" version, should provide the actual identity of the EPCRA Section 313 chemical and have the trade secret claim clearly marked in Part I, Section 2.1 of the Form R or Form A. All other parts of the Form R or Form A must be filled out accordingly.

Individual states may have additional criteria for confidential business information and the submittal of both sanitized and unsanitized reports for EPCRA Section 313 chemicals. Facilities may jeopardize the trade secret status of an EPCRA Section 313 chemical by submitting an unsanitized version to a state agency or Indian tribe that does not require an unsanitized version.

More information on trade secret claims, including contacts for individual state's submission requirements, can be found in the most current version of the *TRI Forms and Instructions.*

2.11 Recordkeeping

Complete and accurate records are absolutely essential to meaningful compliance with EPCRA Section 313 reporting requirements. Compiling and maintaining good records will help you to reduce the effort and cost in preparing future reports and to document how you arrived at the reported data in the event of an EPA compliance audit. EPA requires you to maintain records substantiating the Form R or Form A submission for a minimum of three years from the date of submission. Each facility must keep copies of the Form R or Form A along with all supporting documents, calculations, work sheets, and other forms that you use to prepare the Form R or Form A. EPA may request this supporting documentation during a regulatory audit.

Specifically, EPA requires that the following records be maintained for a period of three years from the date of the submission of a report (summarized from 40 CFR 372.10):

1) A copy of each report that is submitted;

2) All supporting materials and documentation used by the person to make the compliance determination that the facility or establishment is a covered facility;

3) Documentation supporting the report that is submitted, including documentation supporting:

   - Threshold determinations;
   - Employee threshold determinations (including timesheets);
   - Claimed allowable exemptions;

- Calculations for each quantity reported as being released, either on or off site, or otherwise managed as waste;
- Activity use determinations, including dates of manufacturing, processing, or otherwise use;
- Basis of all estimates;
- Receipts or manifests associated with transfers of waste to off-site locations; and
- Waste treatment methods, estimates of treatment efficiencies, ranges of influent concentrations to treatment, sequential nature of treatment steps, and operating data to support efficiency claims.

4) All supporting materials used to make the compliance determination that the facility or establishment is eligible to submit a Form A;

5) Documentation supporting the Form A, including:

- Data supporting the determination that the alternate threshold applies;
- Calculations of annual reporting amounts; and
- Receipts or manifests associated with the transfer of each chemical in waste to off-site locations.

Because EPCRA Section 313 reporting does not require additional testing or monitoring, you must determine the best "readily available data" available source of information to make reporting determinations. Alternatively, you may use reasonable estimates to make reporting determinations. The amount and type of data and records will vary from facility to facility. Examples of records that you should keep, if applicable, include the following:

- Each Form R or Form A submitted;
- Section 313 Reporting Threshold Worksheets (sample worksheets can be found in Chapter 3 of this document as well as in the *TRI Forms and Instructions)*;
- Engineering calculations and other notes;
- Purchase records and MSDSs from suppliers;
- Inventory and receipt data;
- Analytical results and profiles for wastes received from off site;
- NPDES/SPDES permits and monitoring reports;
- EPCRA Section 312, Tier II reports;
- Monitoring records;
- Air permits;
- Flow measurement data;
- RCRA hazardous waste generator's reports;
- Pretreatment reports filed with local governments;
- Invoices from waste management firms;
- Manufacturer's estimates of treatment efficiencies;
- CERCLA Reportable Quantity (RQ) reports;
- EPCRA Section 304 follow-up release notifications;
- RCRA manifests; and

- Process flow diagrams (including emissions, releases and other waste management activities).

Chapter 3 - EPCRA Section 313 Threshold Determinations

3.0 PURPOSE

This chapter provides a step-by-step procedure for determining if any EPCRA Section 313 chemicals or chemical categories exceed a reporting threshold at your facility.

Step 1) Determine if you manufacture (including import), process, or otherwise use any EPCRA Section 313 chemicals.

Step 2) Determine the quantity of each EPCRA Section 313 chemical you manufacture (including import), process, or otherwise use.

Step 3) Determine which EPCRA Section 313 chemicals exceed a threshold.

3.1 Step 1 - Determining which EPCRA Section 313 chemicals are manufactured (including imported), processed, or otherwise used

Compiling Chemical Lists. Compile lists of all chemicals, mixtures, or other trade name products, and wastes at your facility. Petroleum bulk storage facilities may find it helpful to create two lists: one of chemicals processed in petroleum products, and one of purchased chemicals otherwise used at the facility. When developing the list of chemicals processed, refer to information your facility may have or have access to regarding specific chemical constituents and their concentrations, in combination with information found later in this chapter. For the otherwise use list, identify the name of each mixture or other trade name product and write the names of all chemicals contained in each mixture or other trade name product. Next, compare the individual chemicals on both lists to the current EPCRA Section 313 chemical list found in the *TRI Forms and Instructions* (remember that chemicals may be periodically added and deleted so you should always use the most current instructions). Highlight the EPCRA Section 313 chemicals that are on your list. You must perform threshold determinations for these chemicals.

Review the list to be sure each chemical is shown by its correct EPCRA Section 313 name. For example, a common EPCRA Section 313 chemical found at petroleum bulk storage facilities is n-hexane. N-Hexane (CAS No. 110-54-3) has several synonyms, including hexane, hexyl hyride, and Gettysolve-B. It must be reported on Form R (or Form A), Item 1.2, by its EPCRA Section 313 chemical name, n-hexane. Synonyms can be found in the U.S. EPA's document *Common Synonyms for Chemicals Listed Under Section 313 of the EPCRA* (EPA 745-R-95-008) (updated March 1995). EPA's Automated TRI Reporting System (ATRS) has a pick list containing a complete list of EPCRA Section 313 chemical and chemical category names and the corresponding CAS numbers and category codes.

While every chemical and chemical category on the EPCRA Section 313 chemical list must be considered, certain chemicals are more likely than others to be encountered at petroleum bulk storage facilities. As a guide, certain chemicals that petroleum bulk storage facilities are likely to process and/or otherwise use were provided in the previous chapter in Table 2-2. This is not a comprehensive list of all chemicals that may be processed or otherwise used at petroleum

bulk storage facilities, but is merely a starting point for identifying chemicals for threshold determinations.

Information that is useful in performing threshold determinations and preparing your reports includes the following:

- Mixtures and other trade name products containing EPCRA Section 313 chemicals;
- Associated CAS numbers;
- Throughput quantities; and
- Whether the chemical is manufactured, processed, or otherwise used at the facility (be sure to include quantities that are coincidentally manufactured and imported, as appropriate).

Use of Spreadsheets or Databases. A computerized spreadsheet or database may be helpful in developing your facility's chemical list and performing threshold calculations. The type of information useful as input in a spreadsheet or database includes the chemical name, mixture or other trade name product, or waste name with corresponding chemical component, concentrations, the CAS number, and the yearly quantity manufactured, processed, or otherwise used. The spreadsheet or database could also be designed to identify the total quantity by activity threshold (amounts manufactured, processed, and otherwise used) for each EPCRA Section 313 chemical in every waste, mixture, and other trade name product.

Smaller facilities that do not have an established electronic method of tracking their chemical throughout and waste managed, should consider developing a spreadsheet to assist them in their chemical management activities. Developing a spreadsheet will require an initial investment of time; however, the time and effort saved in threshold calculations in subsequent years can be significant. Such a system will also reduce the potential of inadvertently overlooking EPCRA Section 313 chemicals that are present in wastes received or mixtures purchased from off-site sources.

EPCRA Section 313 Chemicals in Purchased Chemicals

To develop the chemical list and identify the associated threshold activities for purchased chemicals you may want to consult the following:

- Material Safety Data Sheets (MSDS);
- Facility purchasing records;
- Inventory records;
- Individual manufacturing/operating functions; and
- Operation and process knowledge;
- Industry Specifications and Reports.

For purchased chemicals, MSDSs are generally considered to be good sources of information for the type and composition of chemicals in mixtures and other trade name products. Petroleum bulk storage facilities may receive MSDSs for any mixtures or other trade name

products purchased for the purposes of repackaging, fuel blending, ancillary cleaning operations, or other operations that require mixtures and other trade name products. As of 1989, chemical suppliers of facilities in SIC codes 2000 through 3999 are required to notify customers that they may be subject to EPCRA Section 313 reporting requirements for any EPCRA Section 313 chemicals present in mixtures or other trade name products that are distributed to facilities. The notice must be provided to the receiving facility and may be attached or incorporated into that product's MSDS. If no MSDS is required, the notification must be in a letter that accompanies the first shipment of the product to your facility. This letter must contain the chemical name, CAS number, and the weight or volume percent of the chemical (or a range) in the mixture or other trade name product. Beginning with the 1998 reporting year, seven new industries will be covered by most of the EPCRA Section 313 reporting requirements and, therefore, facilities in SIC codes 2000 through 3999 will be required to provide these new industries with this supplier notification information. While the new industries are not required to prepare supplier notifications for materials that they distribute to their customers, they are encouraged to pass along the notification to customers receiving these materials who may be subject to EPCRA Section 313. For more information on supplier notification requirements, see *TRI Forms and Instructions, EPCRA Section 313 Question and Answers, Revised 1998 Version* - Appendix A, Directive 9 (EPA-745-B-98-004), or *Supplier Notification Requirements*, (EPA-560/4-91-006).

Carefully review the entire MSDS for your purchased chemicals. Although MSDSs must list whether EPCRA Section 313 chemicals are present, the language and location of this notification is not currently standardized. Depending on the supplier, this information can be found in different sections of the MSDS. The most likely sections of an MSDS to provide information on identity and concentration of EPCRA Section 313 chemicals in purchased chemicals are:

- Hazardous components section;
- Regulatory section;
- Physical properties/chemical composition section;
- Labeling section; and
- Additional information section.

EPCRA Section 313 Chemical List

In order to identify which chemicals are EPCRA Section 313 chemicals, and (in some cases) the form in which they are reportable, you need to compare your list of chemicals managed at your facility to the current Section 313 list of chemicals. The most current list of EPCRA Section 313 chemicals can be found in the *TRI Forms and Instructions* document for the current reporting year. The following discussion is a brief overview of the EPCRA Section 313 list of chemicals, including a description of possible chemical qualifiers.

The original list of EPCRA Section 313 chemicals and chemical categories was comprised from two lists developed by New Jersey and Maryland. EPA refined the list and anticipates changes to continue. The list can be modified by an EPA initiative or though a petition process. When evaluating a chemical for addition or deletion, EPA must consider potential acute and

chronic human health effects and adverse environmental effects and the Agency publishes its findings and any regulatory action through the *Federal Register*.

The EPCRA Section 313 chemical list includes individually listed chemicals and several chemical categories. If you meet the SIC code criterion and exceed the employee threshold, you must file a Form R or Form A for each EPCRA Section 313 chemical or chemical category manufactured, processed, or otherwise used above threshold quantities. When conducting threshold determinations for individually listed chemicals, simply compare the amount of that chemical manufactured, processed, or otherwise used, to each threshold quantity. If you exceed the threshold, you must file a Form R or Form A for that chemical. When determining thresholds for chemical categories, you must total the weights of all members of the category, and compare this sum to each activity threshold. It is important that you compare the amount of compounds in a category separately to each individual activity threshold (manufacturing, processing, or otherwise use). If you exceed *any* of the three activity thresholds for a chemical category, you must file a Form R or Form A for that chemical category.

Many of the EPCRA Section 313 chemical categories are metal compound categories (e.g., chromium compounds). Metal compound categories include any unique chemical substance that contains the metal as part of that chemical's infrastructure. When calculating thresholds for metal compound categories, you must consider the entire weight of the metal compound, not just the weight of the parent metal. However, if you exceed an activity threshold for a metal compound category and you are filing a Form R for that metal compound category, you need only use the weight of the parent metal when calculating quantities released or otherwise managed as waste. Elemental forms of metals (e.g., chromium) are also individually listed on the EPCRA Section 313 chemical list. You must make separate threshold determinations for the elemental metal and the metal compound category (e.g., chromium and chromium compounds). If you exceed thresholds for both the metal and metal compound category, you may submit separate Form Rs, or one *Form R* for both the metal and metal compound category. However, if both the metal and the metal compound qualify for Form A reporting, you must submit separate Form A *certifications* for the metal and metal compound category.

Several chemicals on the EPCRA Section 313 chemical list include qualifiers related to use or form. A few chemicals are reportable ONLY if manufactured by a specified process or in a specified activity threshold. For example, isopropyl alcohol is only reportable if it is manufactured using the strong acid process and saccharin is reportable only if it is manufactured. Some other chemicals are only reportable if present in certain forms. For example, only yellow or white phosphorus are reportable, while black or red phosphorus are not.

Example - Lead and Lead Compounds

A facility has determined that it needs to report under EPCRA Section 313 for both elemental lead and lead compounds. Can this facility file one Form R that takes into account both the releases and other waste management activities of lead and lead compounds, or is it required to report separately?

If a covered facility exceeds thresholds for both the parent metal and compounds of that same metal, it is allowed to file one joint report (e.g., one report for lead compounds and elemental lead). EPA allows this because the release and other waste management information reported in connection with metal compounds will be the total pounds of the parent metal released and otherwise managed as a waste. For data management purposes, EPA requires that the chemical category name and code be placed on the form R (Sections 1.1 and 1.2).

Examples - Chemical Categories

Example 1 A facility otherwise uses 5,000 pounds of 1,3-bis(methylisocyanate)-cyclohexane, 3,000 pounds of 1,5-naphthalene diisocyanate, and 3,000 pounds of 2,2,4-trimethylhexamethylene diisocyanate. All three of these chemicals are members of the diisocyanates category, an EPCRA Section 313 chemical category. The facility otherwise uses 11,000 pounds of diisocyanates, which exceeds the 10,000 pound threshold for otherwise use. The facility must file a Form R or Form A for diisocyanates category.

Example 2 A facility otherwise uses 6,000 pounds of zinc oxide, manufactures 20,000 pounds of zinc sulfate, and processes 18,000 pounds of zinc sulfide. All three compounds are members of the zinc compounds category, an EPCRA Section 313 chemical category. Because the facility does not exceed the otherwise use, manufacturing, or processing thresholds, the facility is not required to file a Form R or Form A for the zinc compound category.

The qualifiers associated with these chemicals which may be applicable to petroleum bulk storage facilities are presented below. A detailed discussion of the qualifier criteria can be found in the *TRI Forms and Instructions.*

- **Fume or dust** - Three metals (aluminum, vanadium, and zinc) are qualified as "fume or dust forms only." This definition excludes "wet" forms such as solutions or slurries, but includes powder, particulate, or gaseous forms of these metals. For example, on-site disposal of a waste received from off-site containing elemental zinc metal needs to be considered in threshold determinations if the zinc is in the form of a fume or dust. However, if zinc (fume or dust) are found during treatment of a zinc-containing waste stream, then these amounts would need to be considered toward the facility's manufacturing threshold. Additionally, the entire weight of all zinc compounds should be included in the threshold determination for zinc compounds. Keep in mind that most metals in most wastes are expected to be in the compound form.

- **Ammonia** has the following qualifier: "ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable salts and other sources; 10% of total aqueous ammonia is reportable under this listing)." Aqueous ammonia is formed from the dissociation of ammonium salts (including ammonium sulfate, ammonium

nitrate, and ammonium chloride) in water and is an EPCRA Section 313 chemical. You must determine the amount of aqueous ammonia generated from solubilizing these chemicals in water and apply it toward the threshold for ammonia. EPA has published guidance on reporting for ammonia, and ammonium salts in *EPCRA Section 313 Question and Answers, Revised 1998 Version - Appendix A, Directive 8.* Additionally, ammonium nitrate in aqueous solutions must be included in threshold determinations and release and other waste management calculations for the nitrate compounds category. (See below)

- **Nitrate Compounds** (water dissociable; reportable only in aqueous solution) - A nitrate compound is covered by this listing only when in water and if dissociated. Although the complete weight of the nitrate compound must be used for threshold determinations for the nitrate compounds category, only the nitrate ion portion of the compound must be considered for release and other waste management determinations. Nitrate compounds are manufactured during the neutralization of nitric acid and in biological treatment of wastewater. EPA has published guidance for these chemicals in *Water Dissociable Nitrate Compounds Category and Guidance for Reporting* (see Appendix C for more information).

- **Phosphorus (yellow or white)** - Only manufacturing, processing, or otherwise use of phosphorus in the yellow or white chemical forms require reporting. Black and red phosphorus are not subject to EPCRA Section 313 reporting.

- **Asbestos (friable)** - Asbestos only need be considered when it is handled in the friable form. Friable refers to the physical characteristic of being able to crumble, pulverize, or reduce to a powder with hand pressure.

- **Aluminum oxide (fibrous)** - Beginning with reports for calendar year 1989, aluminum oxide is only subject to threshold determination when it is handled in fibrous forms. EPA has characterized fibrous aluminum oxide for purposes of EPCRA Section 313 reporting as a man-made fiber that is commonly used in high-temperature insulation applications such as furnace linings, filtration, gaskets, joints, and seals.

- **Sulfuric acid and hydrochloric acid (acid aerosols)** - EPA delisted non-aerosol forms of sulfuric acid (CAS No. 7664-93-9) and hydrochloric acid (CAS No. 7647-01-0) from the EPCRA Section 313 chemical list beginning in the 1994 and 1995 reporting years, respectively. Threshold determinations and release and other waste management estimates now only apply to the aerosol forms. EPA considers the term aerosol to cover any generation of airborne acid (including mists, vapors, gas, or fog) without any particle size limitation. Sulfuric acid and hydrochloric acid (acid aerosols) are manufactured during the combustion of sulfur containing wastes (for sulfuric acid) and chlorine containing wastes (for hydrochloric acid). EPA has published guidance for sulfuric acid in *Guidance for Reporting Sulfuric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)* (see Appendix C for more information).

3.2 Step 2. Determining the quantity of each EPCRA Section 313 chemical manufactured (including imported), processed, or otherwise used

The next step is to determine the quantities manufactured (including imported), processed, and otherwise used for each EPCRA Section 313 chemical on your list (developed in Step 1). Table 3-1 lists the annual reporting thresholds for each of these threshold activities (Tables 3-2 through 3-4 provide detailed definitions of subcategories for each Threshold Activity).

Table 3-1
Reporting Thresholds

Activity	Threshold
Manufacturing (including importing)	More than 25,000 pounds per EPCRA Section 313 chemical
Processing	More than 25,000 pounds per EPCRA Section 313 chemical
Otherwise used	More than 10,000 pounds per EPCRA Section 313 chemical

For each EPCRA Section 313 chemical or chemical category during the reporting year, each threshold must be individually calculated; they are mutually exclusive and are not additive.

Example -Threshold Determination

If your facility manufacturers 22,000 pounds of an EPCRA Section 313 chemical and you also otherwise use 8,000 pounds of the same chemical, you have not exceeded either activity threshold and an EPCRA Section 313 report for that chemical is not required. However, if your facility manufactures 28,000 pounds per year of an EPCRA Section 313 chemical and otherwise uses 8,000 pounds of the same chemical, you have exceeded the manufacturing threshold and all non-exempt releases and other waste management activities of that chemical must be reported on the Form R, including those from the "otherwise use" activity. Additionally, you must also indicate on the Form R in Part II, Section(s) 3.1, 3.2, and 3.3, all non-exempt activities involving the reportable EPCRA Section 313 chemical.

Common Error -Threshold Determination

The amount of the EPCRA Section 313 chemical that is actually manufactured (including the quantity imported), processed, or otherwise used, not the amount in storage or previously disposed, is the amount applied to the threshold determination. For example, your facility disposes of nickel compounds in an on-site landfill. The landfill contains hundreds of thousands of pounds of nickel compounds. Over the course of the reporting year, you dispose of an additional 5,000 pounds of nickel compounds in wastes received from off-site. In this example, only the 5,000 pounds that were disposed of in the current year count toward the "otherwise use" threshold. Therefore, unless you "otherwise use" more than 5,000 pounds elsewhere at the facility, the "otherwise use" threshold has not been exceeded and you would not have to report for nickel compounds.

Each of the threshold activities is divided into subcategories. As discussed in the *TRI Forms and Instructions*, you are required to designate EACH activity and subcategory that applies to your facility not only those for which a threshold was exceeded.

Manufacturing

Manufacturing means producing, preparing, importing, or compounding an EPCRA Section 313 chemical. While petroleum bulk storage facilities may not intend to manufacture an EPCRA Section 313 chemical during its operations, some of the activities could produce EPCRA Section 313 chemicals that may need to be considered towards the manufacturing threshold. You will need to consider if EPCRA Section 313 chemicals are produced coincidentally during any of your operations towards the manufacturing threshold, regardless of whether the chemical only exists for a short period of time, is destroyed by air control equipment, or is captured as residual materials. An example would be the production of ammonia or nitrate compounds in a wastewater treatment system.

The following discussion describes the subsections of manufacturing for reporting purposes (see Table 3-2), and other manufacturing threshold issues that are relevant to petroleum bulk storage facilities.

Table 3-2
Definitions and Examples of Manufactured Chemicals

Manufacturing Activity Subcategory	Examples
Produced or imported for on-site use/processing	-Importation of a chemical for use in spill cleanup activities.
Produced or imported for sale/distribution	-Toluene in jet fuel (JP-4) imported into the customs territory of the U.S.
Produced as a by-product	-Any chemical which is produced during the processing of another chemical that does not remain with the chemical and is sent off-site for distribution in commerce.
Produced as an impurity	-Any chemical which is produced during the processing of another chemical that remains with the chemical and is sent off-site for distribution in commerce.

* More complete discussions of the industry-specific examples can be found in Chapter 4 of this guidance manual.

Chemical Conversions. Perhaps the most overlooked form of manufacturing is chemical conversions. Any new EPCRA Section 313 chemicals produced as a result of these chemical conversions must be counted towards the manufacturing threshold. For example, wastewater treatment is known to form new compounds, notably nitrate compounds. Combustion can also result in the manufacture of other EPCRA Section 313 chemicals, such hydrogen fluoride, hydrochloric acid (aerosol), and sulfuric acid (aerosol).

Manufacturing Threshold as it Applies to Chemical Conversion

The conversion of one metal compound to another metal compound within the same metal compound category is considered the "manufacture" of a metal compound, which must be considered toward threshold calculations. This is identical to how threshold calculations are derived for EPCRA Section 313 chemicals in non-metal compound categories. The unique aspect for metal compounds, as compared to non-metal compounds within a compound category, is how amounts released and otherwise managed are reported. As stated in the final rule (62 FR 23850; May 1, 1997), "if a metal is converted to a metal compound or if a metal compound is converted to another metal compound, a metal compound has been "manufactured" as defined under EPCRA Section 313." However, provided that thresholds are exceeded, facilities are instructed to report only the amount of the parent metal contained in the metal compounds for amounts released or otherwise managed. Facilities have the option to submit one Form R that includes the amounts of the elemental metal from the parent metal along with amounts of the metal portion from the metal compounds on their report, if thresholds for both the elemental metal and its metal compounds have been exceeded.

Importing. The "manufacture" threshold includes importing an EPCRA Section 313 chemical if the facility has *caused* the chemical to be imported. If your facility orders or enters into an agreement to obtain or accept an EPCRA Section 313 chemical (or a mixture or other trade name product or waste containing an EPCRA Section 313 chemical) from a source outside the customs territory of the United States (the 50 states, the District of Columbia, and Puerto

Rico) then your facility has imported a EPCRA Section 313 chemical and amounts must be considered toward the manufacturing threshold. Note that if an entity other than the facility, such as a third party not directly associated with the facility (e.g., a chemical broker), ordered the chemical without specific direction from the facility, then that third party has "caused" the chemical to be imported, and the facility does not need to consider the EPCRA Section 313 chemical toward their manufacturing threshold. Imported chemicals, as well as any others that undergo a manufacturing activity, may also be subsequently processed and/or otherwise used, and amounts associated with these activities need to be applied to all appropriate threshold determinations.

Processing

Processing means preparing an EPCRA Section 313 chemical, or a mixture or other trade name product containing an EPCRA Section 313 chemical for distribution in commerce (usually thought of as the intentional incorporation of an EPCRA Section 313 chemical into a product). Petroleum bulk storage facilities should pay considerable attention to this activity threshold since much of their operations involve blending and repackaging of petroleum products prior to distribution off site in commerce. These activities constitute processing, and amounts of EPCRA Section 313 chemicals "processed" must be considered toward threshold determinations and release and other waste management calculations.

Perhaps the most pivotal element of the processing definition is that the EPCRA Section 313 chemical must be prepared for *distribution into commerce.* If a material is produced or recovered, for use on-site, the material has not been prepared for distribution into commerce, and thus is not counted towards the processing threshold (see the discussion of otherwise use for the applicability of chemicals used on-site). In addition, distribution into commerce does not only mean that the material must be sold to a customer. Distributed in commerce includes any distributive activity in which benefit is gained by the transfer, even if there is no direct monetary gain (e.g., intra-company transfers).

Note: In making threshold determinations, facilities are only required to consider amounts managed at the facility. If a bulk petroleum distribution facility sells products that are not received at the facility, these amounts are not considered toward threshold determinations. For example, if a facility sells 5 million gallons of gasoline within a reporting year, but only 3 million gallons arrive at the facility for subsequent repackaging and distribution, then the facility would only consider 3 million gallons toward threshold determinations.

The following discussion describes various processing activities for reporting purposes (see Table 3-3), along with some processing threshold issues that are relevant to petroleum bulk storage facilities.

Table 3-3
Definitions and Examples of Processed Chemicals

Processing Activity Subcategory	Examples
As a reactant	-May not apply to petroleum bulk storage facilities.
As a formulation component	-Blending of additives or other agents into gasoline and aviation fuel prior to distribution into commerce.
As an article component	-May not apply to petroleum bulk storage facilities
Repackaging for distribution into commerce	-Transfer of gasoline containing MBTE, benzene and toluene from bulk storage tanks to tanker trucks for further distribution in commerce.

* More complete discussions of the industry-specific examples can be found in Chapter 4 of this guidance manual.

Petroleum bulk storage facilities commonly process EPCRA Section 313 chemicals by adding proprietary additive packages to raw gasoline product prior to distribution off-site. Facilities that perform these blending activities must consider the EPCRA Section 313 chemicals in the agents and additives towards the 25,000 pound threshold for processing, even if the concentration of the additives or agents in the final product distributed off site falls below the *de minimis* concentration level. Another blending operation may consist of mixing refined motor fuel with oxygenated compounds such as methanol, ethanol, or methyl tertiary butyl ether (MTBE). However, these blending operations typically occur at the petroleum refinery rather than at the petroleum bulk storage facility.

Petroleum bulk storage facilities must determine what EPCRA Section 313 chemicals are present in petroleum products. Facilities must use their best "readily available data" to identify and estimate the quantity of EPCRA Section 313 chemicals in the petroleum products. If a facility has data regarding chemical constituents in the petroleum products used by the facility, and the facility believes that this is the best "readily available data," then the facility should use this information. If specific concentration data of EPCRA Section 313 chemicals in petroleum products does not exist at your facility, there are several sources where the facility can go to get this. Table 3-4 lists concentrations of EPCRA Section 313 constituents typically found in crude oil and petroleum products. Table 3-5 lists some of the most common petroleum products along with concentrations of EPCRA Section 313 constituents typically present and estimates of how much product must be processed to exceed the 25,000 pound threshold for that constituent.

Table 3-4
Estimated Concentration Values of EPCRA Section 313 Constituents in Crude Oil and Petroleum Products (Weight Percent)

EPCRA Section 313 Chemical	*De Minimis* Level*	Crude Oil	Gasoline (Various Grades)	No.2 Fuel Oil/ Diesel Fuel	Jet Fuel (JP-4)	Kerosene	Lubri-cating Oil	No. 6 Fuel Oil	Aviation Gasoline
Benzene	0.1	0.446 [R]	1.608 [R]	8.0E-04 [A]	1.0 [A]	0.004 [A]	N/A	0.001	0.515 [R]
Biphenyl	1.0	0.060 [R]	0.010 [R]	0.100	0.120 [R]	0.120 [R]	N/A	N/A	N/A
Bromine	1.0	N/A	N/A	N/A	N/A	N/A	N/A	3.0E-06	N/A
Chlorine	1.0	N/A	N/A	N/A	N/A	N/A	N/A	0.0131 [D]	N/A
Cyclohexane	1.0	0.700	0.240	N/A	1.240	N/A	N/A	N/A	N/A
Ethylbenzene	1.0	0.346 [R]	1.605 [R]	0.013 [A]	0.50 [A]	0.127 [A]	N/A	0.0022	0.432 [R]
n-Hexane	1.0	2.463 [R]	7.138 [R]	1.0 [A]	5.60 [A]	0.005 [A]	N/A	N/A	0.126 [R]
MTBE [b]	1.0	N/A	15.00	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	1.0	0.219 [R]	0.444 [R]	0.550	0.468 [R]	0.733 [R]	N/A	0.10	0.10 [R]
Phenanthrene	1.0	N/A	N/A	0.125	N/A	N/A	N/A	N/A	N/A
Phenol	1.0	0.323	0.055	0.064	N/A	0.770	N/A	N/A	N/A
PACs [a]	0.1	0.0004	N/A	N/A	N/A	N/A	N/A	1.13	N/A
Styrene	0.1	N/A	N/A [a]	0.032 [R]	N/A	N/A	N/A	N/A	N/A
Toluene	1.0	0.878 [R]	7.212 [R]	0.032 [A]	3.20 [A]	1.330 [A]	N/A	0.006	7.327
1,2,4-Trimethyl-benzene	1.0	0.326	2.50 [‡]	1.0 [‡]	N/A	N/A	N/A	N/A	N/A
Xylene	1.0	1.420 [R]	7.170 [R]	0.290 [A]	3.20 [A]	0.31 [A]	N/A	0.013	2.204
Antimony [a]	0.1	1.0E-05	N/A	N/A	N/A	N/A	N/A	1.0E-06	N/A
Arsenic [a]	0.1/1.0 [c]	2.0E-05	N/A	8.5 [E-06]	N/A	N/A	N/A	3.06E-05 [D]	N/A
Beryllium [a]	0.1/1.0 [c]	2.0E-07	N/A	5.0 [E-06]	N/A	N/A	N/A	2.7E-06 [D]	N/A
Cadmium [a]	0.1/1.0 [c]	4.0E-07	N/A	2.1 [E-05]	N/A	N/A	N/A	2.0E-06 [D]	N/A
Chromium [a]	0.1/1.0 [d]	4.0E-05	N/A	9.5 [E-05]	N/A	N/A	N/A	3.1E-05 [D]	N/A
Cobalt [a]	1.0	0.0003	N/A	N/A	N/A	N/A	N/A	1.63E-04 [D]	N/A
Copper [a]	1.0	4.0E-05		5.6E-04	N/A	N/A	N/A	3.0E-05	N/A
Lead Compounds	1.0 (organic) 0.1 (inorg.)	N/A	N/A	N/A	N/A	N/A	N/A	1.41E-04 [D]	0.14 (organic)
Manganese [a]	1.0	N/A	N/A	2.1E-05	N/A	N/A	N/A	3.5E-05 [D]	N/A
Mercury [a]	1.0	0.0006	N/A	4.0E-05	N/A	N/A	N/A	9.2E-07 [D]	N/A
Nickel [a]	0.1	0.0055	N/A	3.38E-04	N/A	N/A	N/A	2.6E-03 [D]	N/A
Selenium [a]	1.0	4.0E-05	N/A	N/A	N/A	N/A	N/A	9.5E-06 [D]	N/A
Silver [a]	1.0	N/A	N/A	N/A	N/A	N/A	N/A	2.0E-08	N/A
Zinc Compounds	1.0	N/A	N/A	N/A	N/A	N/A	1.0	N/A	N/A

Unless otherwise noted, Source: *Economic Analysis of the Final Rule to Add Certain Industry Groups to EPCRA Section 313*, Appendix B "Composition of Crude Oil and Petroleum Products."

[A] American Petroleum Institute report prepared for Mr. Jim Durham, EPA (December 23, 1993), regarding revised estimates of heavy petroleum product liquid constituents that are listed as hazardous air pollutants (HAPs) under section 112 of the Clean Air Act Amendments (CAAA).

[R] Radian Corporation report prepared for Mr. James Durham, EPA (August 10, 1993), regarding liquid HAP concentrations of various petroleum products.

[D] Appendix D, Study of Hazardous Air Pollution Emissions from Electric Utility Steam Generating Units--Final Report to Congress, USEPA, OAQPS (February 1998) 453/R-98-004b.

* The *de minimis* concentration values for the metals is for the metal compound.

~ Lead compounds concentration for Aviation Gasoline 100 (Exxon-MSDS).

‡ Concentrations updated with comments received from API.

[a] Constituents are most likely metal compounds rather than the elements. Elements are listed in this table because concentration data are for only the metals occurring in the fuel. Concentrations for metal compounds would be somewhat higher depending on the metal compound. For threshold determination, if the weight of the compound is not known, facilities may use the weight of the lowest metal compound likely to be present.

[@] Data from EPA report prepared by Radian Co. for this constituent are considered suspect and are not recommended for use, based on discussion with Jim Durham of EPA on November 30, 1998.

[b] MTBE may be present to enhance octane in concentrations from 0-15% (industry practice, not sampling results).

[c] The *de minimis* level for inorganic compounds is 0.1; for organic compounds is 1.0.

[d] The *de minimis* level for chromium VI compounds is 0.1; for chromium III compounds is 1.0.

[e] The petroleum products may contain one or more of the following chemicals under the polycyclic aromatic compounds (PACs) category: benzo(a)anthracene, benzo (b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(rst)pentaphene, benzo(a)phenanthrene, benzo(a)pyrene, dibenz(a,h)acridine, dibenz(a,j)acridine, dibenzo(a,h)anthracene, 7H-Dibenzo(c,g)carbazole, dibenzo(a,e)fluoranthene, dibenzo(a,e)pyrene, dibenzo(a,h)pyrene, dibenzo(a,l)pyrene, 7,12-dimethylbenz(a)anthracene, indeno[1,2,3-cd]pyrene, 5-methylchrysene, 1-nitropyrene. For No. 6 fuel oil, the value given is for benzo(a)anthracene.

Table 3-5
Estimated Quantities Required to Exceed the Processing Threshold for Several Petroleum Products

Product	EPCRA Section 313 Chemicals That May Be Present Above *De Minimis*	Concentration (weight percent)	Quantity of Product Required to Meet the 25,000-lb Threshold for Processing (Gallons)
Gasoline (Various Grades)	Benzene	1.608	258,389
	Ethylbenzene	1.605	258,872
	MTBE	15.000	27,699
	–Hexane	7.138	58,208
	Toluene	7.212	57,611
	1,2,4-Trimethylbenzene	2.500	166,196
	Xylene (mixed isomers)	7.170	57,948
No. 6 Fuel Oil	Benz(a)anthracene (PACs)	1.130	276,549
Crude Oil	Benzene	0.446	794,526
	n-Hexane	2.463	143,873
	Xylene (mixed isomers)	1.420	249,548
No. 2 Fuel Oil/Diesel Fuel	1,2,4-Trimethylbenzene	1.000	357,143
Kerosene	Toluene	1.330	274,890
Lubricating Oil	Zinc Compounds	1.000	351,865
Aviation Gas	Benzene	0.515	831,940
	Toluene	7.327	58,475
	Xylene (mixed isomers)	2.204	194,396
Jet Fuel (JP-4)	Benzene	1.0	380,359
	Cyclohexane	1.240	323,305
	n-Hexane	5.60	78,454
	Toluene	3.20	125,281
	Xylene (mixed isomers)	3.20	125,281

Source: *Economic Analysis of the Final Rule to Add Certain Industry Groups to EPCRA Section 313*,Appendices Band H, "*Memorandum from Patrick B. Murphy, Radian/RTP to James F. Durham, EPA/CPB Concerning Petroleum Refinery Liquid HAP and Properties Data, August 10, 1993,*" and "*Memorandum from Paul C. Bailey, Jr., API/Washington, DC to James F. Durham, EPA/CPB Concerning Revised Estimates of Heavy Petroleum Product Liquid Constituents, December 23, 1993*" Updated information from comments received on guidance document for 1,2,4-Trimethylbenzene in gasoline and No. 2 fuel oil/Diesel fuel.

Repackaging. An EPCRA Section 313 chemical that is repackaged and distributed into commerce is considered processed for the purposes of EPCRA Section 313. Because EPA does not currently consider a transfer of waste off site for treatment, disposal, or energy recovery

distribution in commerce, repackaged wastes only need to be considered processed if the waste is sent off-site for recycling. Furthermore, repackaging does not include simple relabeling or direct transfers of containers when the product has not been transferred from the packaging in which it was received. For example, if a facility receives pallets of product in individual containers and simply relabels the individual containers and sends them to several customers, then the facility has not processed amounts of EPCRA Section 313 chemicals in the individual containers.

Example - Repackaging as Processing

A manufacturing *facility* receives shipments of an EPCRA Section 313 *chemical* in rail cars. The *EPCRA Section 313 chemical* is transferred from the rail cars into large tank trucks for distribution to customers. The quantity of the *EPCRA Section 313 chemical* held in the tank trucks is approximately equivalent to the amount held in the rail cars. Would the transfer of the *EPCRA Section 313 chemical* from the rail cars to the tank trucks be considered repackaging and therefore included in "processing" threshold determinations?

Yes. All activities involving the preparation of an *EPCRA Section 313 chemical*, after its "manufacture," for distribution in commerce are to be included in the "processing" threshold determination for that chemical. The Agency defines "processing" to include "...the preparation of a chemical for distribution in commerce in a desirable form, state, and/or quantity (i.e., repackaging)..." (53 FR 4506; February 16, 1988). The act of removing an *EPCRA Section 313 chemical* from one container and placing it in another is considered repackaging, regardless of the size of the containers involved. As such, the *facility* must include any amounts transferred from the rail cars to the tank trucks in its "processing" threshold for that chemical.

Example - Repackaging as Processing

A bulk petroleum terminal receives petroleum via pipeline. The petroleum goes from the pipe into a storage tank and exits the facility again through the pipeline. It is then sent to a petroleum bulk station within the same company but located on non-contiguous or non-adjacent property, which then distributes the petroleum into commerce (i.e., their customers). Did the petroleum terminal "repackage" and "process" the petroleum?

Yes. The petroleum received via pipeline, stored and subsequently transferred to another facility has been repackaged and the EPCRA Section 313 chemicals have been distributed in commerce. Amounts of EPCRA Section 313 chemicals contained in the amount "repackaged" must be considered toward the "processing" threshold.

Transfers Off-site for Recycling. Amounts of EPCRA Section 313 chemicals sent off-site for recycling also must be considered toward the processing threshold of 25,000 pounds. Amounts of materials containing EPCRA Section 313 chemicals sent off-site for recycling are prepared for distribution into commerce. Materials sent off-site for recycling must undergo a recovery step and are, therefore, considered a waste and not eligible for the *de minimis* exemption. Wastes destined for off-site recycling are considered wastes sent off-site for further waste management, which are not eligible for the *de minimis* exemption and must be reported on the Form R in Sections 6 and 8.

Transfers Off-site for Direct Reuse. Amounts of EPCRA Section 313 chemicals sent off-site for direct reuse must be considered toward the processing threshold of 25,000 pounds. Materials are considered to be sent off-site for direct reuse if the materials are distributed into

commerce and are going to be directly used in an operation or application without any recovery steps including the extraction of contaminants. Materials sent off-site for direct reuse are not reported on the Form R in Sections 6 and 8 as recycled or released because the materials are not considered wastes. Because materials sent off-site for direct reuse are not considered wastes, these materials may qualify for the *de minimis* exemption if any EPCRA Section 313 chemical in the material is below the *de minimis* level (see Chapter 3.2.2.3). EPCRA Section 313 chemicals in waste that are sent off-site for further waste management; e.g., disposal, are not considered to be reused.

Otherwise Use

"Otherwise use" is any use of an EPCRA Section 313 chemical that does not fall under the definitions of "manufacture" or "process." Chemicals otherwise used are not incorporated into a product that is distributed into commerce and includes such uses as a processing or manufacturing aid and for such ancillary uses as treating wastes.

Otherwise use of an EPCRA Section 313 chemical also includes disposal, stabilization (without subsequent distribution in commerce), and treatment for destruction if the:

(1) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction was received from off-site for the purposes of further waste management, or

(2) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction was manufactured as a result of waste management activities of materials received from off-site for the purpose of further waste management.

The following discussion describes the subsections of the otherwise use threshold for reporting purposes (see Table 3-6).

Table 3-6
Definitions and Examples of Otherwise Used Chemicals

Otherwise Use Activity Subcategory	Examples
As a chemical processing aid	May not occur in the petroleum bulk storage industry.
As a manufacturing aid	Application of lubricants containing zinc compounds for pump and valve operation.
Ancillary or other use	1,2,4-trimethylbenzene in diesel fuel used to clean bulk storage tanks.

* More complete discussions of the industry-specific examples can be found in Chapter 4 of this guidance manual.

Otherwise Use of EPCRA Section 313 Chemicals In Fuels. The use of fuels to generate power to operate the facility processes is considered an otherwise use activity. Fuels may contain

EPCRA Section 313 chemicals above *de minimis* levels. For example, No. 6 fuel oil may contain benzo(a)anthracene, a member of the polycyclic aromatic compound chemical category, in concentrations above *de minimis* levels. EPA has assembled information on EPCRA Section 313 chemicals in various fuel types from a number of sources. This information is provided in Table 3-6. In the absence of better facility-specific data, facilities may use this table to calculate threshold quantities for EPCRA Section 313 chemicals otherwise used in fuels.

Other Activities. Otherwise use includes the use of EPCRA Section 313 chemicals in activities such as cleaning, maintenance, and water purification. The use of an EPCRA Section 313 chemical to treat another chemical constitutes otherwise use.

Other Examples of EPCRA Section 313 Chemicals that Petroleum Bulk Storage Facilities "Otherwise-Use"

- EPCRA Section 313 chemicals used to clean storage tanks and other equipment (e.g., solvents);
- EPCRA Section 313 chemicals in materials that are used to maintain process equipment (e.g., lubricants, metal alloys);
- EPCRA Section 313 chemicals used to treat wastewater
- EPCRA Section 313 chemicals used to treat wastes; and
- EPCRA Section 313 chemicals in fuel used in any on-site equipment (other than motor vehicles which may be eligible for the motor vehicle maintenance exemption, see *TRI Forms and Instructions*).

Waste Management Activities. For purposes of the otherwise use definition, EPA interprets waste management activities to include recycling, combustion for energy recovery, treatment for destruction, waste stabilization, and release, including disposal. However, for calculating thresholds, the only quantity that should be applied to the otherwise use definition are those that are treated for destruction, stabilized, or disposed on-site. Waste management does not include the storage, container transfer, or tank transfer of an EPCRA Section 313 chemical if no recycling, combustion for energy recovery, treatment for destruction, waste stabilization, or release of the chemical occurs at the facility (62 FR 23850; May 1, 1997).

Table 3-7
EPA Guidance Related to Waste Management Activities

Waste Management Activity	Description
Recycling	As referenced in the May 1, 1997, *Federal Register* and defined in the document, *Interpretations of Waste Management Activities: Recycling, Combustion for Energy Recovery, Treatment for Destruction, Waste Stabilization, and Release* (April 1997), recycling means: (1) the recovery for reuse of an EPCRA Section 313 chemical from a gaseous, aerosol, aqueous, liquid, or solid stream; or (2) the reuse or the recovery for use of an EPCRA Section 313 chemical that is a RCRA hazardous waste as defined in 40 CFR Part 261. Recovery is the act of extracting or removing the EPCRA Section 313 chemical from a waste stream and includes: (1) the reclamation of the EPCRA Section 313 chemical from a stream that entered a waste treatment or pollution control device or process where destruction of the stream or destruction or removal of certain constituents of the stream occurs (including air pollution control devices or processes, wastewater treatment or control devices or processes, Federal or state permitted treatment or control devices or processes, and other types of treatment or control devices or processes); and (2) the reclamation for reuse of an "otherwise used" EPCRA Section 313 chemical that is spent or contaminated and that must be recovered for further use in either the original or any other operations.
Combustion for energy recovery	Combustion for energy recovery is interpreted by EPA to include the combustion of an EPCRA Section 313 chemical that is (1) (a) a RCRA hazardous waste or waste fuel, (b) a constituent of a RCRA hazardous waste or waste fuel, or (c) a spent or contaminated "otherwise used" material; and that (2) has a significant heating value and is combusted in an energy or materials recovery device. Energy or materials recovery devices are boilers and industrial furnaces as defined in 40 CFR §372.3 (See 62 FR 23891). If a reported toxic chemical is incinerated but does not contribute energy to the process (e.g., metal, metal compounds, and chloroflorocarbons), it must be considered treatment for destruction. In determining whether an EPCRA Section 313 listed chemical is combusted for energy recovery, the facility should consider the heating value of the EPCRA Section 313 chemical and not the heating value of the chemical stream.
Treatment for destruction	Means the destruction of an EPCRA Section 313 chemical in waste such that the substance is no longer the EPCRA Section 313 chemical subject to reporting. Treatment for destruction does not include the destruction of an EPCRA Section 313 chemical in waste where the EPCRA Section 313 chemical has a heat value greater than 5,000 British Thermal Units (BTU) and is combusted in any device that is an industrial boiler or furnace. (See 40 CFR §372.3.) "Treatment for destruction" includes acid or alkaline neutralization if the EPCRA Section 313 chemical is the entity that reacts with the acid or base. "Treatment for destruction" does not include: (1) neutralization of a waste stream containing EPCRA Section 313 chemicals if the EPCRA Section 313 chemicals themselves do not react with the acid or base (See 40 CFR §372.3), (2) preparation of an EPCRA Section 313 chemical for disposal, (3) removal of EPCRA Section 313 chemicals from waste streams, and (4) activities intended to render a waste stream more suitable for further use or processing, such as distillation or sedimentation. (Note: Amounts of metals CAN NOT be destroyed and therefore should not be reported as treated for destruction.)

Waste stabilization	Means any physical or chemical process used to either reduce the mobility of hazardous constituents in a hazardous waste or eliminate free liquid as determined by a RCRA approved test method (e.g., Test Method 9095). A waste stabilization process includes mixing the hazardous waste with binders or other materials and curing the resulting hazardous waste and binder mixture. Other synonymous terms used to refer to this process are "stabilization," "waste fixation," or "waste solidification." (See 40 CFR §372.3.)
Release	*Release* is defined by EPCRA Section 329(8) to mean any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles) of any EPCRA Section 313 chemical. (See 40 CFR §372.3.)
Disposal	*Disposal* means any underground injection, placement in landfills/surface impoundments, land treatment, or other intentional land disposal. (See 40 CFR §372.3.)

(See EPA document, *Interpretations of Waste Management Activities: Recycling, Combustion for Energy Recovery, Waste Stabilization and Release* for further detail.)

Waste management activities conducted by a facility on EPCRA Section 313 chemicals in wastes generated on-site are not considered an otherwise use of that chemical. The otherwise use threshold applies to amounts disposed, stabilized (without subsequent distribution in commerce), or treated for destruction from wastes received from off-site or from chemicals generated from waste received from off-site. Simply receiving and storing a waste from off-site for waste management sometime in the future does not trigger an "otherwise use" of those chemicals in waste. However, subsequent activities involving the EPCRA Section 313 chemical in waste managed on-site may require you to consider those amounts toward other threshold activities. For example, recycling of an EPCRA Section 313 chemical for distribution into commerce would apply towards the processing threshold. Likewise, if an EPCRA Section 313 chemical taken from an on-site waste is burned for energy recovery, then amounts would be considered toward the otherwise use threshold.

3.2.1 Concentration Ranges for Threshold Determination

You are required to use your best "readily available data" for estimating EPCRA Section 313 threshold determinations and release and other waste managed calculations. In some cases, the exact concentration of an EPCRA Section 313 chemical in a mixture or other trade name product or in a waste may not be known. In these cases, the waste profile, customer, supplier, or MSDS may only provide ranges, or upper or lower bound concentrations. EPA has developed the following guidance on how to determine concentrations from this type of information for use in threshold determinations:

- If exact concentration is provided, use it.
- If the concentration is provided as a lower and upper bound or as a range, you should use the mid-point in your calculations for the threshold determination. For example, the waste profile states methanol is present in a concentration of not less

than 20% and not more than 40%, or it may be stated as present at a concentration between 20 to 40%. You should use 30% methanol in your threshold calculations.

- If only the upper bound concentration is provided you must use this value in your threshold calculation.

- If only the lower bound concentration of the EPCRA Section 313 chemical is specified and the concentration of other components are given, subtract the other component values from 100%. The remainder should be considered the upper bound for the EPCRA Section 313 chemical and you should use the given lower bound to calculate the mid-point as discussed above. For example, an MSDS states that a solvent used for cleaning contains at least 10% MEK and 60% water. Subtracting the water portion of the compound from 100% leaves 40% as the upper bound for MEK. The mid-point between upper (40%) and lower (10%) bounds is 25%, the value you should use in your threshold calculation.

- If only the lower bound is specified and no information on other components is given assume the upper bound is 100% and calculate the mid-point as above.

Even if the concentration of a chemical is known through engineering knowledge only, the facility is still required to consider the chemical for threshold determinations. For example, facility engineers may have knowledge that nitric acid is manufactured in an on-site incinerator. If there are no waste profiles or permit information specifically listing nitric acid, the facility must still consider the chemical for threshold determinations. This determination should be made based on their best "readily available data", be it process knowledge or other reasonable estimation techniques.

When determining concentration information for wastes, it is important to understand that the *de minimis* exemption does NOT apply to wastes. If your waste profiles (or other information) indicate that there are chemicals present that are below the detection limit, you may still need to include those chemicals in your threshold determinations and release and other waste management calculations. If you have no information to indicate that the chemical exists in the waste stream, you may assume that the concentration is zero. However, if the facility has reason to believe that the EPCRA Section 313 chemical is present in the waste, it may use half of the detection limit for that chemical when making threshold determinations and release and other waste management calculations.

Example - Average Concentration

Is it appropriate for a petroleum bulk storage facility to develop an average concentration for an EPCRA Section 313 chemical contained in thousands of different petroleum products received by the facility, and then use that average as a basis of threshold determination? If so, does EPA have a recommended approach for developing such an average?

EPCRA allows facilities to use their best "readily available data" to provide information required under EPCRA Section 313. When data are not readily available, EPCRA allows facilities to use "reasonable estimates" of the amounts involved. A facility must use its best judgment to determine whether data are "readily available." Thus, with regard to use of average concentration levels, a facility must use its best judgment to decide whether the raw data from which it might base any average concentration level are readily available. In any event, a facility should carefully document its decision making. For example, if a facility decides to use average concentration levels, it should document why the raw data from which the averages are based are not readily available, how it arrived at any average concentration level used, and why the average concentration level is a "reasonable estimate" of the amount of the EPCRA Section 313 chemical in the waste stream. EPA does not have a recommended approach for determining average concentration levels.

3.2.2 Evaluation of Exemptions

EPCRA Section 313 provides facilities with certain exemptions:

- Laboratory activities exemption;
- *De minimis* exemption;
- Article exemption;
- Exemptions that apply to the otherwise use of chemicals: routine janitorial/facility grounds maintenance exemption; personal use exemption; structural component exemption; motor vehicle maintenance exemption; exemption for air or water drawn from the environment or municipal sources for certain uses.

Each of these exemptions is discussed in detail below.

3.2.2.1 Laboratory Activities Exemption.

This exemption includes EPCRA Section 313 chemicals that are manufactured, processed, or otherwise used in a laboratory under the supervision of a technically qualified individual. This exemption may be applicable in such circumstances as laboratory sampling and analysis, research and development, and quality assurance and quality control activities. It does not include pilot plant scale or specialty chemical production. It also does not include laboratory support activities. For example, chemicals used to maintain laboratory equipment are not eligible for the laboratory activities exemption.

Example - Laboratory Activities Exemption

If a facility takes a sample from its process stream to be tested in a laboratory for quality control purposes, are releases of an EPCRA Section 313 chemical from the testing of the sample in the laboratory exempt under the laboratory activities exemption?

Yes, provided that the laboratory at the covered facility is under the direct supervision of a technically qualified individual as provided in 40 CFR 372.38(d). The laboratory exemption applies to the "manufacture," "process," or "otherwise use" of EPCRA Section 313 chemicals and any associated release and other waste management amounts that take place in a qualifying laboratory.

3.2.2.2 *De Minimis* Exemption

If the amount of EPCRA Section 313 chemical(s) present in a mixture or other trade name product processed or otherwise used by the facility is below its *de minimis* concentration level, that amount is considered to be exempt from threshold determinations and release and other waste management calculations. (Note that this exemption does not apply to manufacturing, except for importation or as an impurity as discussed below.) Because wastes are not considered mixtures or other trade name products, the *de minimis* exemption does not apply to wastes. The *de minimis* concentration for mixtures or other trade name products is 1%, except for OSHA-defined carcinogens, which have a 0.1% *de minimis* concentration. If a mixture or other trade name product contains more than one member of a compound category, the weight percent of all members must be summed. If the total meets or exceeds the category's *de minimis* level, the *de minimis* exemption does not apply. Information may only be available that lists the concentration of chemicals in mixtures as a range. EPA has developed guidance on how to determine quantities that are applicable to threshold determinations and release and other waste management calculations when this range straddles the *de minimis* value. EPA has published several detailed questions and answers along with a directive in the *EPCRA Section 313 Q&A Document* that may be helpful if you have additional concerns about the *de minimis* exemption. The *TRI Forms and Instructions* list each EPCRA Section 313 chemical and compound category with the associated *de minimis* value. Tables 3-4 and 3-5 provide *de minimis* levels for chemicals found in petroleum products processed and otherwise used by petroleum bulk storage facilities.

The *de minimis* exemption also applies in limited circumstances to the manufacture of EPCRA Section 313 chemicals. The specific case where EPCRA Section 313 chemicals are coincidentally manufactured in a product and remain in the product as an impurity which is then subsequently distributed in commerce, amounts of EPCRA Section 313 Chemicals are eligible for the *de minimis* exemption. The *de minimis* exemption also applies to EPCRA Section 313 chemicals below the *de minimis* concentration in an imported mixture or other trade name product.

The *de minimis* exemption, however, does not apply to EPCRA Section 313 chemicals that are coincidentally manufactured as byproducts that are separated from the product; nor does it apply to chemicals that are coincidentally manufactured as a result of waste treatment or other waste management activities, or to waste brought on site for waste management. For example, many facilities treat waste solvents by incinerating them. Combustion processes can result in the coincidental manufacture of such EPRCA Section 313 chemicals as sulfuric acid aerosols,

hydrochloric acid aerosols, hydrofluoric acid, and metal compounds. Since the *de minimis* exemption does not apply to the coincidental manufacture of chemicals as byproducts, the formation of these compounds in any concentration must be considered for threshold determinations and release and other waste management calculations. The *de minimis* exemption, however, does apply to recovered products in that if a waste solvent is received from off-site and recycled, then sent off site as a product, the *de minimis* exemption could apply to the recovered product.

Once the *de minimis* level has been met or exceeded, the exemption no longer applies to that process stream, even if the concentration of the EPCRA Section 313 chemical in a mixture or other trade name product later drops below the *de minimis* level. All releases and other waste management activities are subject to reporting after the *de minimis* concentration has been equaled or exceeded, provided an activity threshold has been exceeded.

Example - *De minimis*

A facility receives a mixture with an EPCRA Section 313 chemical in a concentration below the *de minimis* concentration. During processing, the concentration of the EPCRA Section 313 chemical exceeds its *de minimis* level. This facility must consider amounts toward threshold determination and releases and other waste management activities that take place after the point in the process where the *de minimis* level is met or exceeded. The facility does not have to consider toward threshold determinations and release and other waste management estimates, activities that took place before the *de minimis* level was met or exceeded.

3.2.2.3 Article Exemption

An article is defined as a manufactured item if each of the three criteria below applies:

- Is formed to a specific shape or design during manufacture;
- Has end-use functions dependent in whole or in part upon its shape or design; and
- Does not release an EPCRA Section 313 chemical under normal conditions of processing or otherwise use of the item at the facility.

If you receive a manufactured item from another facility and process or otherwise use the item without changing the shape or design, and your processing or otherwise use results in the release of 0.5 pound or less of the EPCRA Section 313 chemical in a reporting year from all like articles, then the EPCRA Section 313 chemical in that item is exempt from threshold determinations and release and other waste management reporting. The article exemption does not apply to the manufacturing of items at your facility.

The shape and design of a manufactured item can change somewhat during processing and otherwise use activities as long as part of the item retains the original dimensions. That is, as a result of processing or otherwise use, if an item retains its initial thickness or diameter, in whole or in part, then it still meets the definition of article. If the item's basic dimensional characteristics are totally altered during processing or otherwise use, the item would not meet the definition, even if there were no releases of an EPCRA 313 chemical from these manufactured items. As an

example, items that do not meet the definition would be items that are cold extruded, such as bar stock that is formed into wire. However, stamping a manufactured item into pieces that are recognizable as the original articles would not change the exemption status as long as the diameter and the thickness of the item remain unchanged. For instance, metal wire may be bent and sheet metal may be cut, punched, stamped, or pressed without losing the article status as long as no change is made in the diameter of the wire or tubing or the thickness of the sheet and, more important, there are no releases of the EPCRA Section 313 chemical(s).

Any processing or otherwise use of an article that results in a release above 0.5 pound per year for each EPCRA Section 313 chemical for all like articles will negate the article exemption. Cutting, grinding, melting, or other processing of a manufactured item could result in a release of an EPCRA Section 313 chemical during normal conditions of use and, therefore, could negate the exemption as an article if the total release exceeds 0.5 pound in a year. However, if all of the resulting waste is recycled or reused, either on site or off site such that the release and other waste management of the EPCRA Section 313 chemical in all like articles does not exceed 0.5 pound, then the article exemption status is maintained. Also, if the processing or otherwise use of similar manufactured items results in a total release and other waste management of less than or equal to 0.5 pound of any individual EPCRA Section 313 chemical in a calendar year, EPA will allow this quantity to be rounded to zero and the manufactured items to maintain their article exemption. The 0.5 pound limit does not apply to each individual article; instead, it applies to the sum of releases and other waste management activities (except recycling) from processing or otherwise use of all like articles for each EPCRA Section 313 chemical contained in these articles.

The *EPCRA Section 313 Q&A* document presents several specific questions and answers/discussion pertaining to the article exemption.

3.2.2.4 Exemptions that Apply to the Otherwise Use of EPCRA Section 313 Chemicals

Some exemptions are limited to the "otherwise use" of an EPCRA Section 313 chemical. EPCRA Section 313 chemicals used in these activities do not need to be included in a facility's threshold determinations nor the associated release and other waste management calculations, provided thresholds are met elsewhere. The following otherwise use activities are considered exempt (see most current versions of *TRI Forms and Instructions* and *EPCRA Section 313 Questions and Answers* documents):

- **EPCRA Section 313 chemicals used in routine janitorial or facility grounds maintenance**. Examples are bathroom cleaners and fertilizers and garden pesticides in similar type or concentration distributed in consumer products. Materials used to clean process-related equipment do not qualify for this exemption.

- **EPCRA Section 313 chemicals for personal use**. Examples are foods, drugs, cosmetics, and other personal items including those items used in cafeterias and infirmaries.

Example - Personal Use Exemption

Ammonia used to clean a cafeteria grill is exempt from threshold determinations and release and other waste management calculations. Chlorine added to the water supply system to prepare potable water for consumption at the facility is also exempt under the personal use exemption.

- **EPCRA Section 313 chemicals in structural components of the facility.** This exemption applies to EPCRA Section 313 chemicals present in materials used to construct, repair, or maintain non-process related structural components of a facility. An example common to all facilities would be the solvents and pigments used to paint the administrative office buildings. Materials used to construct, repair, or maintain process-related equipment (e.g., storage tanks, reactors, and piping) are not exempt.

- **EPCRA Section 313 chemicals used to maintain facility motor vehicles.** This exemption includes the use of EPCRA Section 313 chemicals for the purpose of maintaining motor vehicles operated by the facility. Common examples include EPCRA Section 313 chemicals in gasoline, radiator coolant, windshield wiper fluid, brake and transmission fluid, oils and lubricants, batteries, cleaning solutions, and solvents in paint used to touch up the vehicle. Motor vehicles include cars, trucks, forklifts, and locomotives. Note that this exemption applies only to the OTHERWISE USE of the chemical only. The coincidental manufacture of EPCRA Section 313 chemicals resulting from combustion of gasoline is not considered part of the exemption and any amounts of EPCRA Section 313 chemicals coincidently manufactured should be considered as part of the manufacturing threshold.

Example - Motor Vehicle Exemption

Methanol is purchased for use as a processing aid and as a windshield washer anti-freeze in company vehicles. The amount used for the latter purpose would be exempt and subtracted from the facility total BEFORE the facility total is compared to the otherwise use activity threshold. Even if the facility still exceeds the otherwise use threshold, the amount in the anti-freeze is exempt from release and other waste management reporting.

Example - Motor Vehicle Exemption

How does a facility that collects quantities of used motor oil from motor vehicles owned and operated by the facility consider amounts of the used oil that are subsequently sent off site for recycling?

Amounts of releases (including disposal) or other waste management practices associated with an exempt "otherwise use" of EPCRA Section 313 chemicals are also exempt from release or other waste management calculations, provided the facility does not conduct a subsequent non-exempt activity involving the chemical.

This exemption does NOT apply to stationary equipment. The use of lubricants and fuels for stationary process equipment (e.g., pumps and compressors) and stationary energy sources (e.g., furnaces, boilers, heaters), are NOT exempt.

Example - Use of Lubricants

Lubricants containing EPCRA Section 313 chemicals used on facility vehicles or on-site structural maintenance activities that are not integral to the process are exempt activities. However, lubricants used to maintain pumps and compressors, which aid in facility process-related operations, are not exempt and the amount of the chemical in that lubricant should be applied to the otherwise use threshold.

- **EPCRA Section 313 chemicals in certain air and water drawn from the environment or municipal sources.** Included are EPCRA Section 313 chemicals present in process water and non-contact cooling water drawn from the environment or a municipal source, or chemicals present in compressed air or air used in combustion.

Example - Chemicals in Process Water

A facility uses river water in its cooling tower. The facility draws out of and ultimately returns to the river water that contains 100 pounds of an EPCRA Section 313 chemical. Any amount of the EPCRA Section 313 chemicals that may be contained in the river water does not have to be considered for threshold determinations and release and other waste management calculations because the EPCRA Section 313 chemicals were present in the water as it was drawn from the environment and used in this fashion.

3.2.3 Additional Guidance on Threshold Calculations for Certain Activities

This section covers two specific situations in which the threshold determination may vary from normal facility operations: reuse and remediation activities of EPCRA Section 313 chemicals.

3.2.3.1 On-site Reuse Activities

Threshold determinations of EPCRA Section 313 chemicals that are reused at the facility are based only on the amount of the EPCRA Section 313 chemical that is added during the year, and not the total volume in the system or the amounts reused.

Example - Reuse Activities

A facility operates a heat transfer unit that contains 15,000 pounds of ethylene glycol at the beginning of the year that was in use in prior years. The system is charged with 2,000 pounds of ethylene glycol during the reporting year. The facility has therefore "otherwise used" only 2,000 pounds of the covered EPCRA Section 313 chemical within that particular reporting year. A facility reporting for the first time would consider only the amount of EPCRA Section 313 chemical that is added during its first reporting year towards its "otherwise use" threshold for that year. If, however, the entire heat transfer unit was recharged with 15,000 pounds of ethylene glycol during the year, the facility would consider the 15,000 pounds toward its otherwise use threshold and, exceeding the otherwise use threshold, be required to report.

3.2.3.2 Remediation Activities

EPCRA Section 313 chemicals that are being managed at a remediation site (e.g., Superfund) are not considered manufactured, processed, or otherwise used and therefore, these amounts are not included in the threshold determinations. However, if during remediation activities an EPCRA Section 313 chemical is manufactured, then these amounts would have to be considered toward the manufacturing threshold.

Additionally, if you are conducting remediation for an EPCRA Section 313 chemical for which you have exceeded a threshold elsewhere at the facility above an activity threshold level, you must consider this activity in your release and other waste management calculations. In that case, you must report any release and other waste management of an EPCRA Section 313 chemical due to remediation in Part II, Sections 5 through 8, accordingly, of the Form R. Those quantities, however, would not also be considered as part of the reportable amount for determining Form A eligibility because they are not considered part of normal production related activities.

3.3 Step 3. Determine which EPCRA Section 313 chemicals exceed a threshold

The final step is to determine which chemicals exceed a threshold. At this point you should have:

1. Determined each EPCRA Section 313 chemical at your facility;

2. Determined the threshold activity for each EPCRA Section 313 chemical (manufactured, processed, or otherwise used) and calculated the quantity for each activity.

Now, you must sum the usage for each chemical by threshold activity, subtract all exempt quantities, and compare the totals to the applicable thresholds. Each EPCRA Section 313 chemical exceeding <u>any one</u> of the activity thresholds requires the submission of a Form R. Provided you meet certain criteria you may be eligible to file a Form A rather than a Form R.

<u>POSSIBLE ERROR - What if Your Facility Has No Releases and Other Waste Management Quantities of EPCRA Section 313 Chemicals?</u>

If you meet all reporting criteria and exceed <u>any</u> threshold for an EPCRA Section 313 chemical, you must file a Form R or Form A for that chemical, even if you have zero releases and other waste management activities. Exceeding the chemical activity threshold, not the quantity released and no otherwise managed as waste, determines whether you must report. Note that if the total annual reportable amount is 500 pounds or less, and you do not exceed one million pounds manufactured, processed, or otherwise used for that chemical, then you are eligible to submit a Form A rather than a Form R for that chemical (see Chapter 2.9).

Calculating the Manufacturing Threshold for Section 313 Chemicals in Wastes

Petroleum bulk storage facilities typically do not manufacture chemicals or products intentionally. However, these facilities may coincidently manufacture Section 313 chemicals during incineration, wastewater treatment, and other waste management operations. You will also need to consider whether EPCRA Section 313 chemicals are produced coincidentally, even if the chemical exists for only a short period of time, and later is destroyed by air control equipment. Most commonly, incineration may result in the manufacture of metal compounds (usually as a result of oxidation), acid aerosols, and other organic compounds, or convert metal compounds to the parent metal (e.g., mercury compounds in coal convert to elemental mercury). The following discussion describes how to calculate the manufacturing threshold for these situations.

To calculate the amount of EPCRA Section 313 metal compounds manufactured during combustion of wastes, you will need to determine the concentration of each metal present in the waste being combusted. The best "readily available data" should be used to estimate the approximate concentration of the metal(s) in the waste. If you have data regarding chemical concentrations in the wastes (e.g., analytical data) and believe that is the best "readily available data", then you should use this information. If specific concentration data of the metals in the waste do not exist, you can assume that the metals will convert to the lowest weight metal oxide possible.

During combustion, other EPCRA Section 313 chemicals could be manufactured, particularly acid aerosols. For instance, sulfuric acid aerosols could be produced depending on a variety of factors such as sulfur content of the waste. If you have specific data on the manufacture of acid aerosols, then use it. If data are not available, EPA has published guidance on calculating the amount of sulfuric acid aerosols manufactured during combustion, which could be applied to the combustion of wastes; *Guidance for Reporting Sulfuric Acid (acid aerosols*

including mists, vapors, gas, fog, and other airborne forms of any particle size), EPA, March 1998, available on EPA's TRI website at http://www.epa.gov/opptintr/tri.

To estimate the amount of EPCRA Section 313 chemicals manufactured during wastewater treatment, the Clean Water Act typically requires facilities to monitor some Section 313 chemicals. In particular, the facility's wastewater permit application may have more detailed, chemical-specific monitoring data. However, it is important to note how the chemical is monitored in relation to the EPCRA Section 313 chemical being evaluated. For example, wastewater permits may require monitoring for the nitrate ion, but the nitrogen compound category is calculated by the total weight of the nitrate compound.

Calculating the Otherwise Use and Processing Thresholds for Section 313 Chemicals in Wastes

To determine if a chemical exceeds the processing or otherwise use threshold, you must calculate the annual activity for that chemical. For EPCRA Section 313 chemicals in wastes, start with the amount of chemical in stored waste as of January 1, add the amount of the chemical in waste both received from off-site and generated on-site and any amounts that are manufactured during the treatment during the year, and subtract the amount remaining in storage on December 31. The waste manifests received from your customers will be an invaluable source for determining the quantities of different types of wastes managed by your facility, particularly in terms of classifying how various types and quantities undergo a treatment step, or are disposed by your facility, for example, when determining if the otherwise use threshold has been exceeded.

Calculating Thresholds for Section 313 Chemicals in Purchases

For purchased chemicals, start with the amount of chemical at the facility as of January 1, add any purchases during the year and the amount manufactured (including imported), and subtract the amount remaining in the inventory on December 31. If necessary, adjust the total to account for exempt activities (see Chapter 3.2.2 for a discussion of exemptions). You should then compare the result to the appropriate threshold to determine if you are required to submit an EPCRA Section 313 report for that chemical.

Keep in mind that the threshold calculations are independent for each activity: manufactured, processed, and otherwise used. If more than one activity threshold applies, the amount associated with each activity is determined separately.

Table 3-8 presents a worksheet that may be helpful when conducting your threshold determinations and Table 3-9 illustrates an example of how the work sheet can be used for the following example:

Example - Threshold Worksheet

Assume your facility purchases two petroleum product mixtures that contain xylene in the applicable reporting year. You purchased 25,000 pounds of Mixture A (which is 50% xylene per the MSDS) and 110,000 pounds of Mixture B (which contains 20% xylene). Further, you determine that you repackage the entire quantity of Mixture A, while you blend as an additive half of Mixture B and use the other half as a cleaning solvent on-site. You do not qualify for any exempt activities. In this example, you would have processed a total of 23,500 pounds of xylene (12,500 pounds from activities associated with Mixture A and 11,000 pounds from activities associated with Mixture B). You would also have otherwise used a total of 11,000 pounds (all from Mixture B). Therefore, you would not have exceeded the 25,000 pound threshold for processing; however, you would have exceeded the 10,000 pound threshold for otherwise use and would be required to submit a Form R or Form A for amounts of xylene released or otherwise managed as a waste from all non-exempt sources including those activities where a threshold had not been exceeded.

Table 3-8 Section 313 Reporting Threshold Worksheet

Facility Name: _____
Toxic Chemical or Chemical Category: _____
CAS Number: _____
Reporting Year: _____

Date Worksheet Prepared: _____
Prepared By: _____

Amounts of the toxic chemical manufactured, processed, or otherwise used.

Mixture Name, Waste Name, or Other Identifier	Information Source	Total Weight (lb)	Percent TRI Chemical by Weight	TRI Chemical Weight (in lbs)	Amount of the Listed Toxic Chemical by Activity (in lbs.):		
					Manufactured	Processed	Otherwise Used
1.							
2.							
3.							
4.							
Subtotal:					(A)_____lbs.	(B)_____lbs.	(C)_____lbs.

Exempt quantity of the toxic chemical that should be excluded.

Mixture Name or Waste Name as Listed Above	Applicable Exemption (*de minimis*, article, facility, activity)	Fraction or Percent Exempt (if Applicable)	Amount of the Toxic Chemical Exempt from Above (in lbs.):		
			Manufactured	Processed	Otherwise Used
1.					
2.					
3.					
4.					
Subtotal:			(A_1)_____lbs.	(B_1)_____lbs.	(C_1)_____lbs.
Amount subject to threshold:			($A-A_1$)_____ lbs.	($B-B_1$)_____ lbs.	($C-C_1$)_____ lbs.
Compare to threshold for Section 313 reporting.			25,000 lbs	25,000 lbs.	10,000 lbs.

If any threshold is exceeded, reporting is required for all activities. Do not submit this worksheet with Form R, retain it for your records.

Table 3-9. Sample EPCRA Section 313 Reporting Threshold Worksheet

Facility Name: ABC Petroleum Bulk Storage Company
Toxic Chemical or Chemical Category: Xylene (mixed isomers)
CAS Number: 1330-20-7
Reporting Year: 1998

Date Worksheet Prepared: May 1, 1999
Prepared By: _____

Amounts of the toxic chemical manufactured, processed, or otherwise used.

Mixture Name or Other Identifier	Information Source	Total Weight (lb)	Percent TRI Chemical by Weight	TRI Chemical Weight (in lbs)	Amount of the Listed Toxic Chemical by Activity (in lbs.):		
					Manufactured	Processed	Otherwise Used
1. Mixture A	MSDS	25,000	50%	12,500	---	12,500	---
2. Mixture B	MSDS	110,000	20%	22,000	---	11,000	11,000
3.							
4.							
Subtotal:				34,500	(A) 0 lbs.	(B) 23,500 lbs.	(C) 11,000 lbs.

Exempt quantity of the toxic chemical that should be excluded.

Mixture Name as Listed Above	Applicable Exemption (*de minimis*, article, facility, activity)	Fraction or Percent Exempt (if Applicable)	Amount of the Toxic Chemical Exempt from Above (in lbs.):		
			Manufactured	Processed	Otherwise Used
1. None					
2.					
3.					
4.					
Subtotal:			(A_1) 0 lbs.	(B_1) 0 lbs.	(C_1) 0 lbs.

Amount subject to threshold: ($A-A_1$) 0 lbs. ($B-B_1$) 23,500 lbs. ($C-C_1$) 11,000 lbs.

Compare to threshold for EPCRA Section 313 reporting. 25,000 lbs 25,000 lbs. 10,000 lbs.

If any threshold is exceeded, reporting is required for all activities. Do not submit this worksheet with Form R, retain it for your records.

Chapter 4 - Estimating Releases and Other Waste Management Quantities

4.0 PURPOSE

Once you have determined which EPCRA Section 313 chemicals have exceeded thresholds at your facility, as described in Chapter 3, you must then estimate amounts of these chemicals in waste by particular waste management type (e.g., release to air, transfer off-site, etc.) To aid your facility in making these calculations, this chapter is intended to help you in developing a systematic approach for conducting release and other waste management calculations specific to petroleum bulk storage facilities. This chapter has been divided into two parts. The first part provides a general approach to identifying sources of potential releases and other waste management activities, collecting data, and determining the most appropriate method(s) to develop estimates. Chapter 4.1 also provides insights into the requirements, recommended approaches, and other nuances associated with developing comprehensive and accurate estimates for reportable EPCRA Section 313 chemicals. To illustrate this approach, a diagram of recommended steps for estimating quantities of reportable EPCRA Section 313 chemicals released or otherwise managed as wastes is provided in Figure 4-1.

Chapter 4.2 of this chapter provides a focused discussion with examples of methods and tools to use in calculating estimates of releases and other waste management activities specific to many petroleum bulk storage facilities. In particular, Chapter 4.2 provides specific examples and issues pertaining to common chemical thresholds in the petroleum bulk storage industry. These chemical thresholds are:

- Loading/unloading of petroleum products;
- Storage of petroleum products;
- Blending/mixing of petroleum products;
- Tank cleaning and equipment maintenance; and
- Wastewater treatment and oil water separation.

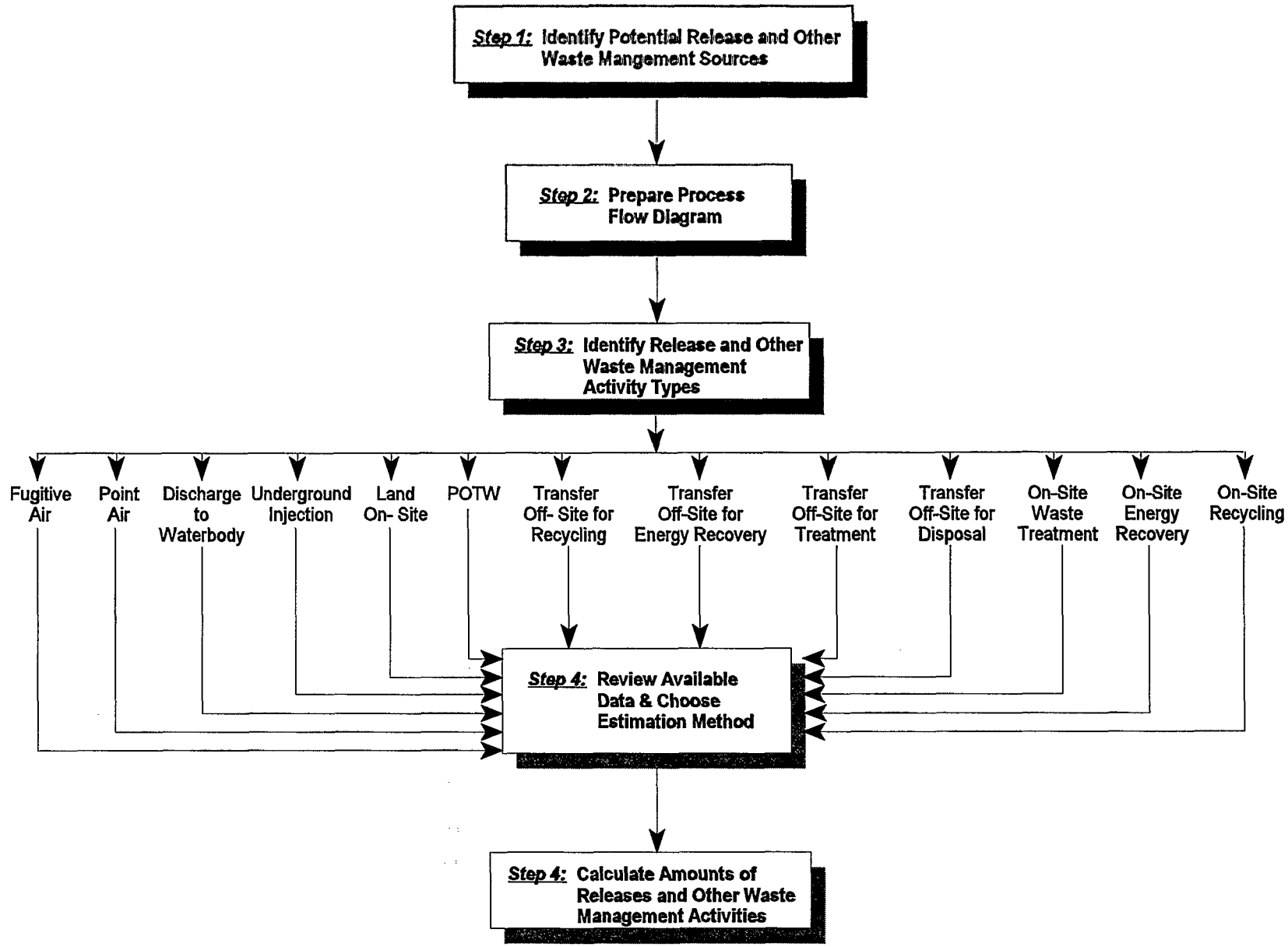

Figure 4-1 Release and Other Waste Management Calculation Approach

4.1 General Steps for Determining Releases and Other Waste Management Activities

You can develop release and other waste management estimates by completing these four basic steps. See Figure 4-1 for illustration of this four-step process.

Step 1) Identify potential sources of chemicals released or otherwise managed as waste.

Step 2) Prepare a process flow diagram.

Step 3) Identify on-site releases, off-site transfers, and other on-site waste management activity types.

Step 4) Determine the most appropriate method(s) to develop the estimates for releases and other waste management activity quantities and calculate the estimates.

These steps are described in detail in the following sections.

4.1.1 Step 1: Identify Potential Sources of Chemical Release and Other Waste Management Activities

The first step in release calculations is to identify all areas at your facility that could potentially release reportable Section 313 chemicals. Consider all potential sources at which reportable EPCRA Section 313 chemicals may be released and otherwise managed from each unit operation and process. Remember to include upsets and routine maintenance activities. Potential sources include the following:

- Relief valves;
- Pumps;
- Stacks;
- Volatilization from process or treatment;
- Fittings;
- Transfer operations;
- Flanges;
- Storage tanks;
- Stock pile losses;
- Waste treatment discharges;
- Process discharge stream;
- Container residues;
- Recycling and energy recovery byproducts;
- Accidental spills and releases;
- Storm water runoff;
- Clean up and housekeeping practices;
- Treatment sludge; and
- Combustion byproducts.

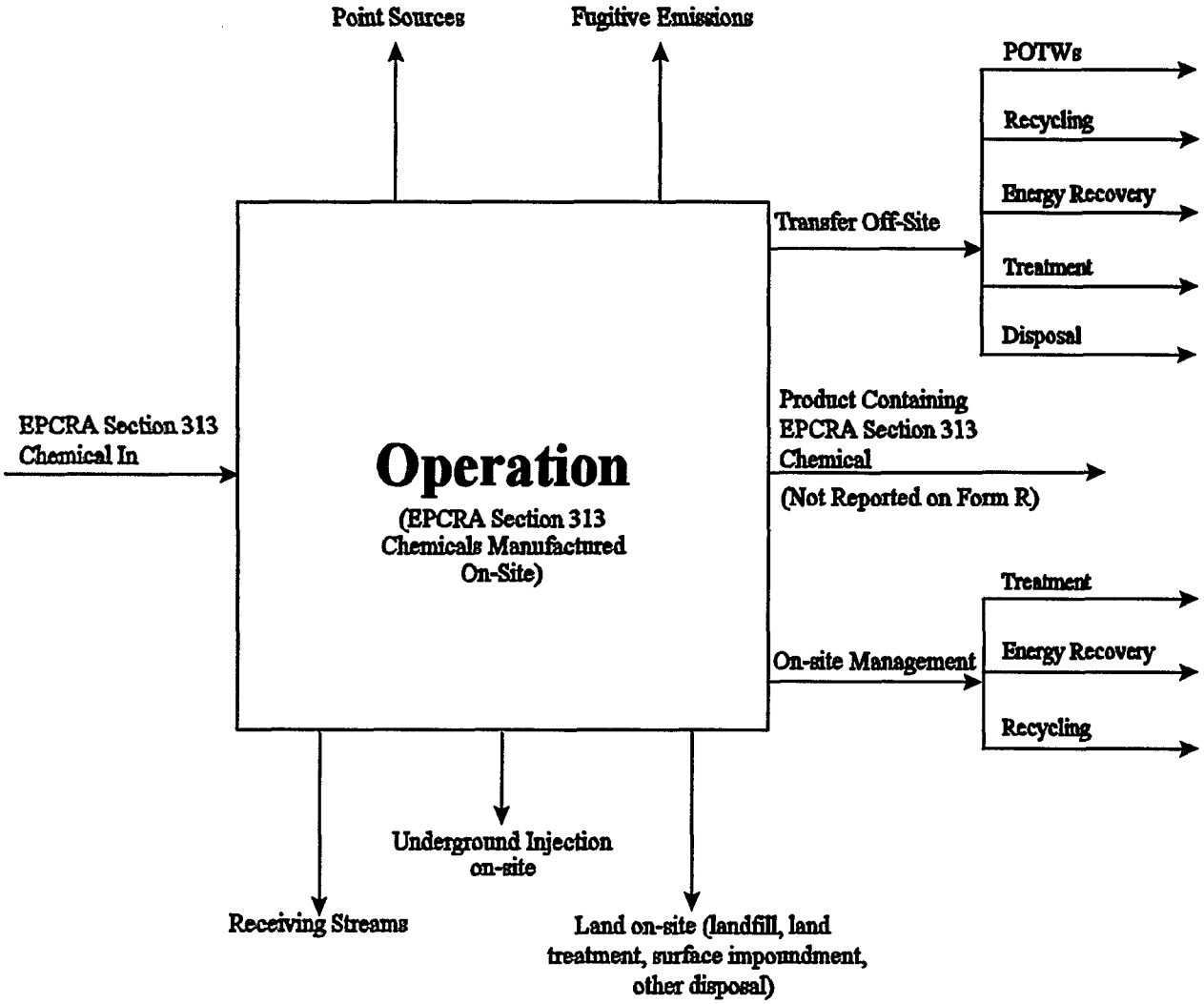

Figure 4-2. Possible Release and Other Waste Management Types for EPCRA Section 313 Chemicals

Next, you must identify the reportable EPCRA Section 313 chemicals that are released and otherwise managed from each source. A thorough knowledge of the facility's operations and processes will be required to make an accurate determination of which chemicals are involved, including those EPCRA Section 313 chemicals that are coincidentally manufactured during these processes.

4.1.2 Step 2: Prepare a Process Flow Diagram

Preparing a process flow diagram will help you calculate your releases by illustrating the life-cycle of the reportable EPCRA Section 313 chemical(s), as well as help you identify any sources of chemicals that are released and otherwise managed as waste at your facility that you might have missed in step 1. Depending on the complexity of your facility, you may want to diagram individual processes or operations rather than the entire facility. The diagram should illustrate how materials flow through the processes and identify material input, generation, and output points. By reviewing each operation separately, you can determine where EPCRA Section 313 chemicals are manufactured, processed, or otherwise used and the medium to which they will be released on-site, transferred off-site for further waste management, or otherwise managed as wastes on-site.

4.1.3 Step 3: Identify On-Site Releases, Off-Site Transfers and On-Site Waste Management Activity Types

For each identified source of an EPCRA Section 313 chemical, you must examine all possible releases and other waste management activities. Figure 4-2 is a schematic of releases and other waste management activities as they correspond to individual data elements on the Form R. Remember to include both routine operations and accidents when identifying types of chemical management activities. This diagram, along with the following descriptions, can be used as a checklist to make sure all possible types of releases and other waste management activities have been considered.

a. **Fugitive or Non-Point Air Emissions (Part II, Section 5.1 of Form R)** - Emissions to the air that are not released through stacks, vents, ducts, pipes, or any confined air stream. Examples include:

- Equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines, etc.;
- Releases from building ventilation systems, such as a roof fan in an open room;
- Evaporative losses from solvent cleaning tanks, surface impoundments, and spills; and
- Emissions from any other fugitive or non-point sources.

b. **Stack or Point Air Emissions (Part II, Section 5.2 of Form R)** - All emissions to the air which occur through stacks, vents, ducts, pipes, or any confined air stream, including storage tank emissions and emissions from air pollution control equipment. Emissions released from general room air through a ventilation system

are not considered stack or point releases for the purpose of EPCRA Section 313 reporting unless they are channeled through an air pollution control device. Instead, they are considered fugitive releases. You should note that some state air quality agencies consider ventilation systems without an attached pollution control device to be a stack or point source, and other agencies consider releases from storage tanks to be fugitive emissions.

c. **Discharges to Receiving Streams or Water Bodies (Part II, Section 5.3 of Form R)** - Direct wastewater discharges to a receiving stream or surface water body. Discharges usually occur under a National Pollutant Discharge Elimination System (NPDES) permit.

d. **Underground Injection On site to Class I Wells (Part II, Section 5.4.1 of Form R)** and to Class II through V Wells (Part II, Section 5.4.2 of Form R) Disposal into an underground well at the facility. These wells may be monitored under an Underground Injection Control (UIC) Program permit. RCRA Hazardous Waste Generator Reports may be a good source of information for wastes injected into a Class I well. Injection rate meters combined with waste profiles may provide the necessary information for all classes of wells.

e. **Releases to Land On Site (Part II, Section 5.5 of Form R)** - All releases to land on site, both planned (i.e., disposal) and unplanned (i.e., accidental release or spill). The four predefined subcategories for reporting quantities released to land within the boundaries of the facility are:

e(1). **Landfill** - The landfill may be either a RCRA permitted or a non-hazardous waste landfill. Both types are included if they are located on site.

e(2). **Land treatment/application farming** - Land treatment is a disposal method in which a waste containing an EPCRA Section 313 chemical is applied to or incorporated into soil. Volatilization of an EPCRA Section 313 chemical due to the disposal operation must be included in the total fugitive air releases and/or should be excluded from land treatment/application farming to accurately represent the disposition of the EPCRA Section 313 chemical and to avoid double counting.

Sludge and/or aqueous solutions that contain biomass and other organic materials are often collected and applied to farm land. This procedure supplies a nitrogen source for plants and supplies metabolites for microorganisms. EPA considers this operation to be land treatment/farming if it occurs on site. If a facility sends this material off site for the same purpose, it is considered to be a "transfer to an off site location, disposal" and should be reported under Part II, Sections 6.2 and 8.1 of the Form R.

The ultimate disposition of the chemical after application to the land does not change the required reporting. For example, even if the chemical is eventually biodegraded by microorganisms or plants, it is not considered recycled, reused, or treated.

e(3). **Surface impoundment** - A surface impoundment is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials that is designed to hold an accumulation of wastes containing free liquids. Examples include: holding, settling, storage, and elevation pits; ponds; and lagoons.

You do not have to report quantities of an EPCRA Section 313 chemical that are released to a surface impoundment as part of a wastewater treatment operation in this section. However, if the sludge from the surface impoundment contains the EPCRA Section 313 chemical, then the EPCRA Section 313 chemical in the sludge must be estimated in this section unless the sludge is removed and subjected to another waste management activity. In that case, it should be reported for that activity, as appropriate.

e(4). **Other disposal** - Releases to land that do not fit the categories of landfills, land treatment, or surface impoundment are classified as other disposal. This category also includes any spills or leaks of the EPCRA Section 313 chemical to land.

f. **Transfers Off Site to a Publicly Owned Treatment Works (POTW) (Part II, Section 6.1 of Form R)** The amount of EPCRA Section 313 chemical in water transferred to an off site POTW.

g. **Transfers to Other Off-Site Locations (Part II, Section 6.2 of Form R)** All amounts of the EPCRA Section 313 chemical transferred off-site for the purposes of waste treatment, disposal, recycling, or energy recovery. Be sure to include quantities of the EPCRA Section 313 chemical in non-hazardous wastes (such as sanitary waste and facility trash) transferred off-site and metals in waste transferred off site for recycling.

Any residual chemicals in "empty" containers transferred off-site would also be reported in Section 6.2. EPA expects that all containers (bags, totes, drums, tank trucks, etc.) will have a small amount of residual solids and/or liquid. On-site cleaning of containers must be considered for EPCRA Section 313 reporting. If the cleaning occurs with a solvent (organic or aqueous), you must report the disposition of the waste solvent as appropriate. If the containers are sent off site for disposal or reclamation, you should report the EPCRA Section 313 chemical in this section.

Actual data and a knowledge of the unloading methods at your facility can be used to estimate the quantity of residual chemicals in containers. However, EPA has developed guidance to assist facilities if there is no site-specific information. Table 4-1 provides results from experimentation on residue quantities for a sample of waste types if left in drums and tanks when emptied. These results are presented as the mass percent of the vessel capacity and are categorized based on unloading method, vessel material, and bulk fluid material properties such as viscosity and surface tension.

Table 4-1
Summary of Residue Quantities From Pilot-Scale Experimental Study[a,b] (weight percent of drum capacity)

Unloading Method	Vessel Type	Value	Material			
			Kerosene[c]	Water[d]	Motor Oil[e]	Surfactant Solution[f]
Pumping	Steel drum	Range Mean	1.93 - 3.08 2.48	1.84 - 2.61 2.29	1.97 - 2.23 2.06	3.06 3.06
Pumping	Plastic drum	Range Mean	1.69 - 4.08 2.61	2.54 - 4.67 3.28	1.70 - 3.48 2.30	Not Available
Pouring	Bung-top steel drum	Range Mean	0.244 - 0.472 0.404	0.266 - 0.458 0.403	0.677 - 0.787 0.737	0.485 0.485
Pouring	Open-top steel drum	Range Mean	0.032 - 0.080 0.054	0.026 - 0.039 0.034	0.328 - 0.368 0.350	0.089 0.089
Gravity Drain	Slope-bottom steel tank	Range Mean	0.020 - 0.039 0.033	0.016 - 0.024 0.019	0.100 - 0.121 0.111	0.048 0.048
Gravity Drain	Dish-bottom steel tank	Range Mean	0.031 - 0.042 0.038	0.033 - 0.034 0.034	0.133 - 0.191 0.161	0.058 0.058
Gravity Drain	Dish-bottom glass-lined tank	Range Mean	0.024 - 0.049 0.040	0.020 - 0.040 0.033	0.112 - 0.134 0.127	0.040 0.040

[a]From "Releases During Cleaning of Equipment." Prepared by PEI Associates, Inc., for the U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Washington, D.C. Contract No. 68-02-4248. June 30, 1986.

[b]The values listed in this table should only be applied to similar vessel types, unloading methods, and bulk fluid materials. At viscosities greater than 200 centipoise, the residue quantities can rise dramatically and the information on this table is not applicable.

[c]For kerosene, viscosity = 5 centipoise, surface tension = 29.3 dynes/cm^2

[d]For water, viscosity = 4 centipoise, surface tension = 77.3 dynes/cm^2

[e]For motor oil, viscosity = 97 centipoise, surface tension = 34.5 dynes/cm^2

[f]For surfactant solution viscosity = 3 centipoise, surface tension = 31.4 dynes/cm^2

The following example describes how the information in the table can be used to estimate the quantity of an EPCRA Section 313 chemical in water that was used to clean drums on site.

Example - Container Residue

You have determined that a Form R for an EPCRA Section 313 chemical must be submitted. The facility receives and treats 1,000 steel drums that contain 55 gallons of an aqueous waste that contains 10% of the chemical. Further, it is assumed that the physical properties of the solution are similar to water. The solution is pumped from the drums directly into a mixing vessel and the "empty" drums are triple-rinsed with an aqueous cleaning solution. The rinse water is indirectly discharged to an on-site wastewater treatment system and the cleaned drums are returned to the supplier.

In this example, it can be assumed that all of the residual solution in the drums was transferred to the rinse water. Therefore, the quantity transferred to the drum reclaimer should be reported as "zero."

The quantity of residual solution that is transferred to the rinse water can be estimated by multiplying the mean weight percent of residual water from pumping a steel drum by the weight of solution in the drum (density of solution multiplied by drum volume). If the density is not known, it may be appropriate to use the density of water (8.34 pounds per gallon):

(2.29%*) (8.34 pounds/gallon) (55 gallons/drum) (1,000 drums) = 10,504 pounds solution

The concentration of the EPCRA Section 313 chemical in the solution is only 10%.

(10,504 pounds solution) (10%) = 1,050 pounds

Therefore, 1,050 pounds of the chemical are transferred to the on-site wastewater treatment system

*Mean value taken from Table 4-1

h. On-Site Waste Treatment (Part II, Section 7A of Form R) All on-site waste treatment of reported EPCRA Section 313 chemicals. The information reported in Section 7A focuses on the treatment of the waste stream. The information includes: type of waste stream (gaseous, aqueous or non-aqueous liquid, or solid); treatment methods or sequence; influent concentrations of the EPCRA Section 313 chemical; treatment efficiency of each method or sequence; and whether efficiency data are based on actual operating data. Metal compounds in waste subjected to a combustion process are not destroyed but should still be reported as going through the treatment process, with a treatment efficiency of zero.

Example - On-Site Waste Treatment

A process at the facility generates a wastewater stream containing an EPCRA Section 313 chemical (chemical A). A second process generates a wastewater stream containing two EPCRA Section 313 chemicals, a metal (chemical B) and a mineral acid (chemical C). Thresholds for all three EPCRA Section 313 chemicals have been exceeded and you are in the process of completing separate Form Rs for each chemical.

All wastewater streams are combined and sent to an on-site wastewater treatment system before being released to a POTW. This system consists of an oil/water separator which removes 99% of chemical A; a neutralization tank where the pH is adjusted to 7.5, thereby destroying 100% of the mineral acid (chemical C), and a settling tank where 95% of the metal (chemical B) is removed from the water (and eventually landfilled off site).

Section 7A should be completed slightly differently for each chemical for which a Form R must be filed. The table accompanying this example shows how Section 7A should be completed for each chemical. First, on each Form R you should identify the type of waste stream in Section 7A.1a as wastewater (aqueous waste, code W). Next, on each Form R you should list the code for each of the treatment steps that are applied to the entire waste stream, regardless of whether the operation affects the chemical for which you are completing the Form R (for instance, the first four blocks of Section 7A.1b of all three Form Rs should show: P19 (liquid phase separation), C11 (neutralization), P11 (settling/clarification), and NA (to signify the end of the treatment system). Note that Section 7A.1b is the only section of the Form R that is not chemical specific. It applies to the entire waste stream being treated. Section 7A.1c of each Form R should show the concentration of the specific chemical in the influent to the first step of the process (oil/water separation). For this example, assume chemicals A, B, and C are all present at concentrations greater than 1%. Therefore, code "1" should be entered. Section 7A.1d is also chemical specific. It applies to the efficiency of the entire system in destroying and/or removing the chemical for the Form R you are currently completing. 99% should be entered when filing for chemical A, 95% for chemical B, and 100% for chemical C. Finally, you should report whether the influent concentration and efficiency estimates are based on operating data for each chemical, as appropriate.

Chemical A					
7A.1a	7A.1b	1. P19 2. C11	7A.1c	7A.1d	7A.1e
W	3. P11 4. NA 5. ____ 6. ____ 7. ____ 8. ____		1	99 %	Yes X No ____

Chemical B					
7A.1a	7A.1b	1. P19 2. C11	7A.1c	7A.1d	7A.1e
W	3. P11 4. NA 5. ____ 6. ____ 7. ____ 8. ____		1	95 %	Yes X No ____

Example - On-Site Waste Treatment (cont.)					
Chemical C					
7A.1a	7A.1b	1. P19 2. C11	7A.1c	7A.1d	7A.1e
W	3. NA 4. ____ 5. ____		1	100 %	Yes No
	6. ____ 7. ____ 8. ____				X ____

Note that the quantity removed and/or destroyed is not reported in Section 7 and that the efficiency reported in Section 7A.1d refers to the amount of EPCRA Section 313 chemical destroyed and/or removed from the applicable waste stream. The amount actually destroyed should be reported in Section 8.6 (quantity treated on site). For example, when completing the Form R for chemical B you should report "0" pounds in Section 8.6 because the metal has been removed from the wastewater stream, but not actually destroyed. The quantity of chemical B that is ultimately land filled off site should be reported in Section 6.2 and 8.1. However, when completing the Form R for chemical C you should report the entire quantity in Section 8.6 because raising the pH to 7.5 will completely destroy the mineral acid.

I. **On-Site Energy Recovery (Part II, Section 7B of Form R)** All on-site energy recovery of reported EPCRA Section 313 chemicals must be reported. EPA's view is that chemicals that do not contribute significant heat energy during combustion processes should not be considered for energy recovery. Therefore, only chemicals with a significant heating value (e.g., heating value high enough to sustain combustion) that are combusted in an energy recovery unit, such as an industrial furnace, kiln, or boiler can be reported for energy recovery. If an EPCRA Section 313 chemical is incinerated on-site but does not significantly contribute energy to the process (e.g., chlorofluorocarbons), it must be considered on-site waste treatment (see Chapter 4.1.3(h). above). Metal and metal compounds in a waste that is combusted cannot be considered combusted for energy recovery because metals do not have any heat value.

j. **On-Site Recycling (Part II, Section 7C of Form R)** All on-site recycling methods used on EPCRA Section 313 chemicals must be reported.

k. **Source Reduction and Recycling Activities (Part II, Section 8 of Form R)**[1] Provide information about source reduction and recycling activities related to the EPCRA Section 313 chemical for which releases and other waste management activities are being reported. Section 8 uses some data collected to complete Part

[1]The subsection 8.1 through 8.8 designation are those for the 1997 Form R. Please refer to the current reporting year's *TRI Forms and Instructions* for any changes.

II, Sections 5 through 7. For this reason, Section 8 should be completed last. The relationship between Sections 5, 6, and 8.8 to Sections 8.1, 8.3, 8.5, and 8.7 are provided in equation forms below.

k(1). **Quantity Released (Part II, Section 8.1 of Form R)** - The quantity reported in Section 8.1 is the quantity reported in all of Section 5 plus the quantity of metals and metal compounds reported as discharged off site to POTWs in Section 6.1 plus the quantity reported as sent off site for disposal in Section 6.2 minus the quantity reported in Section 8.8 that was released on-site or transferred off-site for disposal:

Section 8.1 = Section 5 + Section 6.1 (metals and metal compounds) + Section 6.2 (disposal) - Section 8.8 (release or off-site disposal only)

k(2). **Quantity Used for Energy Recovery On-Site (Part II, Section 8.2 of Form R)** - Estimate a quantity of the EPCRA Section 313 chemical in wastes combusted for energy recovery on-site. This estimate should be the quantity of the chemical combusted in the process for which codes were reported in Section 7B (unless the 7B code is related to a Section 8.8 activity). Test data from trial burns or other monitoring data may be used to estimate the quantity of the EPCRA Section 313 chemical combusted for energy recovery purposes. If monitoring data are not available, vendor specifications regarding combustion efficiency may be used as they relate to the reportable EPCRA Section 313 chemical. A quantity should be reported in Section 8.2 when a method is reported in Section 7B (unless the 7B code is related to a Section 8.8 activity). Combustion for energy recovery is interpreted by EPA to include the combustion of an EPCRA Section 313 chemical that is (1) (a) a RCRA hazardous waste or waste fuel, (b) a constituent of a RCRA hazardous waste or waste fuel, or (c) a spent or contaminated "otherwise used" material; and that (2) has a significant heating value and is combusted in an energy or materials recovery device. Energy or materials recovery devices are boilers and industrial furnaces as defined in 40 CFR 372.3 (see 62 FR 23891, May 1, 1997). If a reported EPCRA Section 313 chemical is incinerated but does not contribute energy to the process (e.g., metal, metal compounds, and chlorofluorocarbons), it must be considered treatment for destruction. In determining whether an EPCRA Section 313 listed chemical is combusted for energy recovery, the facility should consider the heating value of the EPCRA Section 313 chemical and not of the chemical stream. Note that "NA" should be reported for EPCRA Section 313 chemicals which are halogens, CFCs, halons, and metals.

k(3). **Quantity Used for Energy Recovery Off-Site (Part II, Section 8.3 of Form R)** - The quantity reported in Section 8.3 is the quantity reported in Section 6.2 for which energy recovery codes are reported. If a quantity is

reported in Section 8.8, subtract any associated off-site transfers for energy recovery:

Section 8.3 = Section 6.2 (energy recovery) - Section 8.8 (off-site energy recovery)

Combustion for energy recovery is interpreted by EPA to include the combustion of an EPCRA Section 313 chemical that is (1) (a) a RCRA hazardous waste or waste fuel, (b) a constituent of a RCRA hazardous waste or waste fuel, or (c) a spent or contaminated "otherwise used" material; and that (2) has a significant heating value and is combusted in an energy or materials recovery device. Energy or materials recovery devices are boilers and industrial furnaces as defined in 40 CFR 372.3 (see 62 FR 23891, May 1, 1997). If a reported EPCRA Section 313 chemical is incinerated but does not contribute energy to the process (e.g., metal, metal compounds, and chlorofluorocarbons), it must be considered treatment for destruction. In determining whether an EPCRA Section 313 listed chemical is combusted for energy recovery, the facility should consider the heating value of the EPCRA Section 313 chemical and not of the chemical stream. Note that "NA" should be reported for EPCRA Section 313 chemicals which are halogens, CFCs, halons, and metals.

k(4). Quantity Recycled On-Site (Part II, Section 8.4 of Form R) - Estimate a quantity of the EPCRA Section 313 chemical recycled in wastes on-site. This estimate should be the quantity of the chemical recycled in the operation for which codes were reported in Section 7C (unless the 7C code is related to a Section 8.8 activity). A quantity should be reported in Section 8.4 when a method of on-site recycling is reported in Section 7C (unless the 7C code is related to a Section 8.8 activity). To estimate this quantity, you should determine if operating data exist which indicate a recovery efficiency and use that efficiency value combined with throughput data to calculate an estimate. If operating data are unavailable, use available vendor specifications.

k(5). Quantity Recycled Off-Site (Part II, Section 8.5 of Form R) - The quantity reported in Section 8.5 will generally be the same as the quantity reported in Section 6.2 for which recycling codes are reported. If a quantity is reported in Section 8.8, subtract any associated off-site transfers for recycling:

§8.5 = §6.2 (recycling) - §8.8 (off-site recycling)

k(6). Quantity Treated On-Site (Part II, Section 8.6 of Form R) - Waste treatment in Section 8 is limited to the destruction or chemical conversion of the EPCRA Section 313 chemical in wastes. The quantities reported in Section 8.6 will be those treated in a subset of the operations for which

codes were reported in Section 7A, where treatment can include physical removal of the EPCRA Section 313 chemical(s) from a waste stream. To estimate the quantity, you should determine if operating data exist which indicate a treatment (e.g., destruction or chemical conversion of EPCRA Section 313 chemical) efficiency and use that efficiency value combined with throughput data to calculate an estimate. Because metals cannot be destroyed or chemically converted into something other than the metal or metal compound, metals cannot be reported as treated in Sections 8.6 or 8.7. Note that conversion of a metal from one oxidation state to another (e.g., Cr(VI) to Cr(III) is not considered treatment in Section 8.6. If operating data are unavailable, use available vendor specifications. Section 7A must be completed if a quantity is entered into Section 8.6.

k(7). Quantity Treated Off-Site (Part II, Section 8.7 of Form R) - This quantity reported in Section 8.7 must be the same as the quantity reported in Section 6.2 for which treatment codes are reported and quantities sent to a POTW as reported in Section 6.1 except for metal and metal compounds. If a quantity is reported in Section 8.8, subtract any associated off-site transfers for treatment:

Section 8.7 = Section 6.1 (except metals and metal compounds) + Section 6.2 (treatment) - Section 8.8 (off-site treatment)

Because metals cannot be destroyed or chemically converted into something other than the metal or metal compound, metals cannot be reported as treated in Sections 8.6 or 8.7. Quantities of metals reported in Section 6.1 and 6.2 as being treated should be reported in Section 8.1 (Quantity Released) unless the facility has knowledge that the metal is being recovered.

k(8). Quantity Released to the Environment as a Result of Remedial Actions, Catastrophic Events, or One-Time Events Not Associated with Production Processes (Part II, Section 8.8 of Form R) - The purpose of this section is to separate quantities recycled, used for energy recovery, treated, or released (including disposal) that are associated with normal or routine production from those that are not. The quantity reported in Section 8.8 is the quantity of the EPCRA Section 313 chemical released directly into the environment or sent off-site for recycling, waste treatment, energy recovery, or disposal during the reporting year due to any of the following events:

(1) Remedial actions;
(2) Catastrophic events such as earthquakes, fires, or floods; or
(3) One-time events not associated with normal or routine production processes.

The quantity reported in Section 8.8 should not be included with quantities reported in Part II, Sections 8.1 through 8.7 of Form R, but should be included in Part II, Sections 5 and 6 of Form R as appropriate. The on-site waste management activities should also be reported in Section 7.

Spills that occur as a routine part of production operations and could be reduced or eliminated by improved handling, loading, or unloading procedures are included in the quantities reported in Sections 8.1 through 8.7 as appropriate. On-site releases and off-site transfers for further waste management resulting from remediation of an EPCRA Section 313 chemical or an unpreventable accident unrelated to production (such as a hurricane) are reportable in Section 8.8.

On-site treatment, energy recovery, or recycling of EPCRA Section 313 chemicals in wastes generated as a result of remedial actions, catastrophic events, or one-time events not associated with production processes are not reported in Part II, Section 8.8 nor Sections 8.1 through 8.7 of Form R.

k(9) **Prior Year Estimates (for Part II, Sections 8.1 – 8.7 of Form R)** -. In several instances, the Form R prompts the facility for information from prior reporting years. In Section 8, Source Reduction and Recycling Activities, Column A of Sections 8.1-8.7 requests release and other waste management information from the prior reporting year. Because 1998 is the first year that petroleum bulk storage facilities were required to collect data for EPCRA Section 313 reporting, you may enter "NA" in column A for Form Rs for RY 1998 only. In Section 8.9, you are required to provide a production ratio or activity index to reflect either the ratio of current year's production to prior year's production or an index of the current year's activity to prior year's activity with respect to the reportable EPCRA Section 313 chemical. Because you were not required to collect data prior to 1998, recently added facilities as a result of the industry expansion rulemaking may also enter "NA" in Section 8.9 for Form Rs for RY 1998 only.

POSSIBLE ERROR - Double Counting

Releases and other waste management activities should not be inadvertently "double counted." A single wastewater discharge should not be listed as both a release to water (on site) and a discharge to POTW (off site). Similarly, a release to land should not be listed as both a release to land (on site) and a transfer to an off-site landfill. Estimates of releases and other waste management activities should be prepared for Sections 5 through 7 of the Form R. For the most part, Section 8 relies on the data collected to complete these previous sections. Therefore, Section 8 should be completed last. However, the data elements of Section 8 (8.1 through 8.7) are mutually exclusive and care should be taken to avoid double counting.

4.1.4 Step 4: Determine the Most Appropriate Method(s) to Develop the Estimates for Releases and Other Waste Management Activity Quantities and Calculate the Estimates

After you have identified all of the potential sources for release and other waste management activity types, you must next estimate the quantities of each reportable chemical released and otherwise managed as waste. EPA has identified four basic methods that may be used to develop estimates (each estimate has been assigned a code that must be identified when reporting). The methods and corresponding codes are:

- Monitoring Data or Direct Measurement (M);
- Mass Balance (C);
- Emission Factors (E); and,
- Engineering Calculations (O).

Descriptions of these techniques are provided in *Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form.* They are also briefly described below. EPA does not require you to conduct additional sampling or testing for Section 313 reporting; however, you are required to use the best "readily available data" or prepare reasonable estimates. For example, emission factors or engineering calculations may not be the best "readily available data" when other data, such as stack testing, are available. For each reported amount, you are required to identify only the primary method used for each estimate.

Based on site-specific knowledge and potential data sources available, you should be able to determine the best method for calculating quantities for each release and other waste management activity. Many potential sources of data exist for these (and other) methods of developing estimates. Table 4-2 presents potential data sources and the estimation methodology in which they are most likely to be used.

Table 4-2
Potential Data Sources for Release and Other Waste Management Calculations

DATA SOURCES	
Monitoring Data (M)	**Mass Balance (C)**
• Stack monitoring data • Outfall monitoring data • Air permits • Industrial hygiene monitoring data • NPDES permits • POTW pretreatment standards • Effluent limitations • RCRA permit • Hazardous waste analysis • pH for acids • Continuous emission monitoring	• Supply records • Hazardous material inventory • Air emissions inventory • Pollution prevention reports • Hazardous waste manifests • Spill event records
Emission Factors (E)	**Engineering Calculations (O)**
• AP-42 or other EPA emission factors • Published facility or trade association chemical-specific emission factors	• Volatilization rates • Raoult's Law • Henry's Law • Solubilities • Non-published emission factors • Facility or trade association non chemical specific emission factors (e.g., SOCMI factors)

Once estimation methods have been determined for all potential sources, releases and other waste management activities, an estimate for each reportable EPCRA Section 313 chemical can be developed corresponding to the data elements on Form R.

4.1.4.1 Monitoring Data or Direct Measurement (code M)

Using monitoring data or direct measurements is usually the best method for developing estimates for chemical releases and other waste management activity quantities estimates. Your facility may be required to perform monitoring under provisions of the Clean Air Act (CAA), Clean Water Act (CWA), Resource Conservation and Recovery Act (RCRA), or other regulations. If so, these data should be available for developing estimates. Data may have also been collected for your facility through an occupational health and safety assessment. If only a small amount of direct measurement data are available or if you believe the monitoring data are not representative, you must determine if another estimation method would give a more accurate result.

Example - Monitoring Data

Data from the on-site wastewater treatment facility indicate that the annual average concentration of copper in the POTW discharge is 2 mg/L. The wastewater treatment facility processed 1.5 million gallons of water in 1997. The treated wastewater is discharged to an off-site POTW. The amount of copper transferred off site to the POTW (for Part II, Section 6.1 of the Form R) is estimated as follows:

Amount of copper transferred

$$= (2mg/L)*\left(\frac{1g}{1{,}000mg}\right)*\left(\frac{1lb}{453.59g}\right)*\left(\frac{1L}{0.2642gal}\right)*(1{,}500{,}000gal/yr)$$

$$= 25lbs/yr$$

POSSIBLE ERROR - Treatment Efficiencies

Vendor data on treatment efficiencies often represent ideal operating conditions. Thus, you should adjust such data to account for downtime and process upsets during the actual reporting year that would result in lower efficiencies. Remember that efficiencies reported by vendors are often general and may not apply to specific chemicals or uses of the equipment. For example, an incinerator or flare may be 99.99% efficient in combusting organic chemicals, but will have a zero percent efficiency in combusting metals.

4.1.4.2 Mass Balance (code C)

A mass balance involves determining the amount of an EPCRA Section 313 chemical entering and leaving an operation. The mass balance is written as follows:

Input + Generation = Output + Consumption

where:

- Input refers to the materials (chemicals) entering an operation. For example, chlorine added to process water as a disinfectant would be considered an input to the water treatment operation.

- Generation identifies those chemicals that are created during an operation (manufactured, including coincidental manufacturing). For example, additional ammonia, sodium nitrite, or nitrate compounds may be coincidentally manufactured in biological wastewater treatment systems.

- Output means any avenue by which the EPCRA Section 313 chemical leaves the operation. Output may include on-site releases and other on-site waste management activities; transfers for treatment, disposal, energy recovery, or recycling; or the amount of chemical that leaves with the final product. In a solvent recovery operation, for example, the recovered solvent product and wastes generated from the process are outputs.

- Consumption refers to the amount of chemical that is converted to another substance during the operation (i.e., reacted). For example, phosphoric acid would be consumed by neutralization during wastewater treatment.

The mass balance technique may be used for manufactured, processed, or otherwise used chemicals. It is typically useful for chemicals that are "otherwise used" and do not become part of the final product, such as catalysts, solvents, acids, and bases. For large inputs and outputs, a mass balance may not be the best estimation method, because slight uncertainties in mass calculations can yield significant errors in the release and other waste management estimates.

Example - Estimating Releases to Air Using Mass Balance

A facility uses an EPCRA Section 313 chemical as a refrigerant in condensers to control air emissions and adds 20,000 pounds to the refrigeration system in 1998 (to make up for system losses). The chemical is released to the air from relief vents, during system filling operations and from leaks in valves and fittings. During system maintenance, the lines are bled directly into water and the system is vented to the air. Monitoring data of the wastewater, including chemical concentrations and wastewater throughput, indicate that 1,200 pounds of the chemical were discharged to the wastewater in 1998. The remaining losses are assumed to be fugitive air releases and are estimated as follows:

Fugitive air releases of the EPCRA Section 313 chemical

= Amount input (lbs/yr) - Amount released to wastewater (lbs/yr)

= 20,000 lbs/yr - 1,200 lbs/yr

= 18,800 lbs/yr

POSSIBLE ERROR - Mass Balances for Otherwise Used Chemicals

If you are performing mass balance to estimate the quantity for a particular data element, make sure you include all inputs and outputs as precisely as possible. If, for example, you identify all inputs properly, but you fail to include all outputs, your estimate could be inaccurately inflated. Furthermore, if all inputs and outputs are identified, but are not precise, the estimate of the release in question could also be inaccurate.

4.1.4.3 Emissions Factors (code E)

An emission factor is a representative value that attempts to relate the quantity of a chemical released with an associated activity. These factors are usually expressed as the weight of chemical released divided by a unit weight, volume, distance, or duration of the activity releasing the chemical (e.g., pounds of chemical released per pounds of product produced). Emission factors, commonly used to estimate air emissions, have been developed for many different industries and activities. You should carefully evaluate the source of the emission factor and the conditions for its use to determine if it is applicable to the situation at your facility.

Many emission factors are available in EPA's *Compilation of Air Pollutant Emission Factors* (AP-42). The use of AP-42 emission factors is appropriate in developing estimates for emissions from boilers and process heaters. Equations are presented in AP-42 to calculate chemical specific emission factors for liquid material loading/unloading of transportation vehicles and storage tanks. AP-42 can be accessed at EPA's Technology Transfer Network (TTN) website: http://www.epa.gov/ttn/chief/ap42.html.

It should be noted that, for purposes of EPCRA Section 313 reporting, the only estimates that can be reported as "emission factors (code E)" are published chemical-specific emission factors.

Emission Factors

Emissions from petroleum in storage occur because of evaporative losses. External and internal floating roof tanks are sources of emissions because of evaporative losses that occur during standing storage and withdrawal of liquid from the tank. Standing storage losses are a result of evaporative losses through rim seals, deck fittings, and/or deck seams.

A number of equations used to calculate total VOC losses in pounds per year from storage tanks can be found in *AP-42*. The total losses from storage tanks are equal to the sum of the standing storage loss and working loss. Variables such as tank design, liquid temperature, and wind velocity are taken into account when determining standing storage loss and working loss. The emission equations for fixed-roof tanks in AP-42 were developed for vertical tanks; however, the equations can also be used for horizontal tanks by modifying the tank parameters as specified in AP-42.

Once the total volatile organic compound (VOC) loss is calculated, you can then determine the emission rate of each constituent in the vapor. In general, the emission rate for individual components can be estimated by multiplying the weight fraction of the constituent in the vapor by the amount of total VOC loss. The weight fraction of the constituent in the vapor can be calculated using the mole fraction and the vapor pressure of the constituent (equations found in AP-42).

4.1.4.4 Engineering Calculations (code O)

Engineering calculations are assumptions and/or judgements used to estimate quantities of EPCRA Section 313 chemicals released or otherwise managed. The quantities are estimated by using physical and chemical properties and relationships (e.g., ideal gas law, Raoult's law) or by modifying an emission factor to reflect the chemical properties of the EPCRA Section 313 chemical in question. Engineering calculations rely on the process parameters; you must have a thorough knowledge of the processes at your facility to complete these calculations.

Engineering calculations can also include computer models. Several computer models are available for estimating emissions from landfills, wastewater treatment, water treatment, and other processes.

Non-chemical-specific emission factors (e.g., SOCMI emission factors) and non-published emission factors also can be used as discussed in Section 4.1.4.3, but must be classified as "engineering calculations" for EPCRA Section 313 reporting.

Example - Engineering Calculations

Stack monitoring data are available for xylene but you have exceeded a threshold for toluene and must determine amount released or otherwise managed. Toluene is used in the same application as xylene at your facility. You can estimate the emissions of toluene by adjusting the monitoring data of xylene by a ratio of the vapor pressure for xylene to toluene. This example is an engineering calculation based on physical properties and process operation information:

From facility stack monitoring data, an estimated 200 lbs. of xylene is released as air emissions during the reporting year. Toluene is also present in the air emissions, but not monitored. The stack operates at approximately 125°C. Based on literature data, the vapor pressures at 125°C for toluene is 1.44 atmospheres and for xylene is 0.93 atmospheres. Using a ratio of the vapor pressures, the amount of toluene released as air emissions from the stack can be calculated:

$$\frac{\text{X lbs/yr toluene}}{\text{200 lbs/yr xylene}} = \frac{\text{1.44 atm (vapor pressure of toluene)}}{\text{0.93 atm (vapor pressure of xylene)}}$$

$$\text{X lbs/yr toluene} = \frac{\text{(200 lbs/yr xylene) x (1.44 atm toluene)}}{\text{(0.93 atm xylene)}}$$

Completing the calculation, the facility determines that 310 pounds of toluene were released as stack air emissions during the reporting year.

4.1.4.5 Estimating Releases and Other Waste Management Quantities

Once all sources, types, and appropriate estimation methodologies have been identified, you can estimate the release and other waste management activity quantities for each data element of the Form R. The recommended approach is that you estimate the amounts released from all sources at your facility by the data element on the form R (i.e., first estimate all fugitive emissions for an EPCRA Section 313 chemical (Part II, Section 5.1), then estimate all stack air releases for an EPCRA Section 313 chemical (Part II, Section 5.2), etc.). Table 4-3 presents a work sheet that may be helpful in compiling this information.

If you submit a Form R, you must also enter on-site waste treatment information in Section 7A, including the code for each treatment method used, the treatment efficiency for the chemical in the treated waste stream, and the concentration of the chemical in the influent sent to treatment. You should report treatment methods that do not actually destroy or remove the chemical by entering "0" for removal efficiency. Similarly, on-site energy recovery methods and on-site recycling methods must be reported in Section 7B and 7C, respectively.

Table 4-3 Release and Other Waste Management Quantity Estimation Worksheet

Facility Name: _____ Date Worksheet Prepared: _____
Toxic Chemical or Chemical Category: _____ Prepared by: _____
CAS Number: _____
Reporting Year: _____

ON-SITE			
Release or Other Waste Management Activity Type	**Amount (lbs)**	**Basis of Estimate**	**Form R Element**
FUGITIVE AIR			
Equipment Leaks			5.1, (8.1 or 8.8)
Process Areas			5.1, (8.1 or 8.8)
Evaporative Losses (spills, surface impoundments)			5.1, (8.1 or 8.8)
Total =			5.1, (8.1 or 8.8)
STACK AIR			
Process Vents			5.2, (8.1 or 8.8)
Storage Tanks			5.2, (8.1 or 8.8)
Control Device Stacks			5.2, (8.1 or 8.8)
Other			5.2, (8.1 or 8.8)
Total =			5.2, (8.1 or 8.8)
RECEIVING STREAM/WATER BODY DISCHARGE			
Stormwater Discharge			5.3, (8.1 or 8.8)
On-Site Treatment Plant Discharge			
Total =			
ON-SITE UNDERGROUND INJECTION			
Underground Injection to Class I Wells			5.4, (8.1 or 8.8)
Underground Injection to Class II -V Wells			5.4, (8.1 or 8.8)
ON-SITE LAND			
Landfill			5.5, (8.1 or 8.8)
Land Treatment/Application Farming			5.5,(8.1,8.6, or 8.8)
Surface Impoundment			5.5,(8.1 or 8.8)
Other			
Total =			5.5,(8.1 or 8.8)
ON-SITE ENERGY RECOVERY			8.2
ON-SITE RECYCLING			8.4
ON-SITE TREATMENT			8.6

OFF-SITE				
Release or Other Waste Management Activity Type	**Amount (lbs)**	**Basis of Estimate**	**Form R Data Element**	**Off-Site Location (name)**
OFF-SITE DISPOSAL				
Solidification/Stabilization (metals and metal compounds only)			6.2, (8.1 or 8.8)	
Amount of metal and metal compounds to POTW			6.1, (8.1 or 8.8)	
Wastewater Treatment (excluding POTWs) metals and metal compounds only			6.2, (8.1 or 8.8)	
Underground Injection			6.2, (8.1 or 8.8)	
Landfill/Surface Impoundment			6.2, (8.1 or 8.8)	
Land Treatment			6.2, (8.1 or 8.8)	
Other Land Disposal			6.2, (8.1 or 8.8)	
Other Off-site Management			6.2, (8.1 or 8.8)	
OTHER AMOUNTS SENT OFF-SITE				
Amounts sent for storage			6.2, (8.1 or 8.8)	
Amounts sent for unknown waste management practice			6.2, (8.1 or 8.8)	
OFF-SITE TREATMENT				
Solidification/Stabilization			6.2,(8.7 or 8.8)	
Incineration/Thermal Treatment			6.2, (8.7 or 8.8)	
Incineration/Insignificant Fuel Value			6.2, (8.7 or 8.8)	
Wastewater Treatment (to POTW excluding metals and metal compounds)			6.1, (8.7 or 8.8)	
Wastewater Treatment (Excluding POTW and metal and metal compounds)			6.2, (8.7 or 8.8)	
Transfer to Waste Treatment Broker			6.2, (8.7 or 8.8)	
OFF-SITE ENERGY RECOVERY				
Off-site Energy Recovery			6.2, (8.3 or 8.8)	
Transfer to Energy Recovery Broker			6.2, (8.3 or 8.8)	
OFF-SITE RECYCLING				
Solvents/Organics Recovery			6.2, (8.5 or 8.8)	
Metals Recovery			6.2, (8.5 or 8.8)	
Other Reuse or Recovery			6.2, (8.5 or 8.8)	
Acid Regeneration			6.2, (8.5 or 8.8)	
Transfer to Recycling Waste Broker			6.2, (8.5 or 8.8)	

4.1.5 OTHER FORM R ELEMENTS

4.1.5.1 Maximum Amount On-Site (Part II, Section 4.1 of Form R)

In this section of the Form R, you are required to report the code that indicates the maximum quantity of the EPCRA Section 313 chemical present at your facility at any time during the reporting year. This estimate includes any amount of the chemical on-site in storage, in process vessels, in treatment units, and in shipping containers. This calculation includes quantities of the EPCRA Section 313 chemical present in purchased chemicals and in wastes. When performing the calculation, use only the total amount of the chemical present at your site at any one time. For example, assume you have a facility that incinerates waste and sends the remaining ash to an off-site landfill. In February, you receive waste with 500 pounds of benzene which you process completely within the month. In September, you receive waste with 600 pounds of benzene which you also process in a similar time frame. If you have no other sources of benzene on-site, your maximum amount estimation would be 600 pounds (range code 02). These codes are provided in the *TRI Forms and Instructions* document.

4.1.5.2 Production Ratio or Activity Index (Part II, Section 8.9 of Form R)

For this data element, you are required to provide a ratio of reporting year production to prior year production or provide an "activity index" based on a variable other than production that is the primary influence on the quantity of the reported EPCRA Section 313 chemical recycled, used for energy recovery, treated, or disposed. The ratio or index must be reported to the nearest tenths or hundredth place (e.g., one or two digits to the right of the decimal point). Because the facilities added by the facility expansion rulemaking were not required to collect data until reporting year (RY) 1998, these facilities may enter "NA" in this data element regardless of whether the chemical existed at your facility in the previous year (i.e., RY 1997). In future years, however, petroleum bulk storage facilities may only enter "NA" in the production ratio or activity index data element if the EPCRA Section 313 chemical was not manufactured, processed, or otherwise used in the year prior to the reporting year for which a Form R is being submitted.

You may choose either the production ratio or activity index depending on the chemical and how the chemical is used at your facility. The major factor in selecting whether to use a production ratio or activity index is typically a measure of which activity threshold applies. Typically, production ratio would apply to EPCRA Section 313 chemicals manufactured and processed by a facility, while otherwise use activities would be best measured using an activity index. A key consideration in developing a methodology for determining a production ratio/activity index is that you should choose a methodology that is least likely to be affected by potential source reduction activities. In most cases, the production ratio or activity index should be based on some variable of production or activity rather than on EPCRA Section 313 chemical or material usage.

For example, suppose you use an EPCRA Section 313 chemical as a cleaning solvent to perform tank washouts. Using a production ratio based on the amount of the product produced in the tanks between the prior and current reporting years may seem logical but may not take into

consideration potential source reduction activities. As a result, an activity index may be more appropriate. In this instance, an activity index based on the number of tank washouts conducted would be more accurate in reflecting the potential source reduction activities that could be implemented for that chemical and/or activity. For example, a source reduction activity might include the facility deciding to modify the production process such that they would need to clean the tanks less often and, therefore, use less cleaning solvent. The use of an activity index based on tank washouts would better reflect the factors that influence the amount of solvent managed as a waste than would a production ratio based on the amount of product produced in the tanks.

Example - Activity Index

A facility repackages formulated gasoline product, containing 8% n-hexane. In the previous year, the facility received 300,000 gallons of the product for repackaging. For the current reporting year, the facility received 200,000 gallons for repackaging. One method that the facility may use to generate a production ratio would be to divide 200,000 gallons from this year by 300,000 gallons from last year.

$$\frac{\text{200,00 gal. gasoline (current reporting year)}}{\text{300,000 gal. gasoline (previous reporting year)}}$$

= 0.67 Activity Index

4.1.5.3 Source Reduction (Part II, Sections 8.10 and 8.11 of Form R)

The final two sections of the Form R are used for reporting any source reduction activities conducted at the facility. Section 8.10 asks whether there has been any source reduction at the facility during the current reporting year. If so, *TRI Forms and Instructions* provides a list of three-digit codes that the facility must choose from to describe these source reduction activities. Source reduction activities do not include recycling, treating, using for energy recovery, or disposing of an EPCRA Section 313 chemical. Report in this section only the source reduction activities implemented to reduce or eliminate the quantities reported in Section 8.1 through 8.7.

Under Section 8.11, check "yes" if you would like to attach any optional information on source reduction, recycling, or pollution control activities for the EPCRA Section 313 chemical at your facility. This information can be reported for the current reporting year, or for prior year activities. The Agency asks that you limit this information to one page that summarizes the source reduction, recycling, or pollution control activities implemented by your facility.

4.2 Calculating Release and Other Waste Management Estimates at Petroleum Bulk Storage Facilities

This section discusses the most common releases and other waste management activities at petroleum bulk storage facilities and gives guidance for estimating these quantities. The discussion is organized by release or other waste management type, as follows:

- Fugitive Air Emissions
- Stack or Point Source Air Emissions
- Water Discharges
- Releases to Land
- On-site Waste Management
- Transfers Off-site
- Pollution Prevention Data

Facilities must report all releases and other waste management activities of any EPCRA Section 313 chemicals that exceed activity thresholds at the facility. While this chapter is designed primarily for petroleum bulk storage facilities, the release and other waste management reporting issues may be relevant to all potentially reporting facilities. In particular, facilities that store and transfer large volumes of product will find the estimation techniques discussed in this chapter (e.g., methods of calculating air releases) useful.

Note that releases from operations in which petroleum products are not brought on site to be stored and redistributed off site are not subject to EPCRA Section 313 reporting. For example, a storage facility may send tanker trucks to pick up gasoline from a refinery and transport it directly to the gasoline station without bringing the fuel to be stored on site at the storage facility. The releases from these types of transfers are not reported on the storage facility's Form R.

As mentioned earlier in the chapter, process flow diagrams are a very useful way for facilities to identify all sources of releases and other waste management activities. Figure 4-3 illustrates common operations and releases and other waste management outputs at petroleum bulk storage facilities. Petroleum products enter the facility in bulk quantities via pipeline, rail car, tank truck, or vessel, depending on the location of the facility. While on site, the petroleum is stored in large storage tanks and then subsequently dispensed into tanker trucks, rail cars, or pipelines to be distributed in commerce. The facility also may engage in mixing or blending of the petroleum products prior to distribution off-site. While Figure 4-3 is not meant to represent all petroleum bulk storage facilities, it can be used as a starting point for creating a facility-specific process flow diagram.

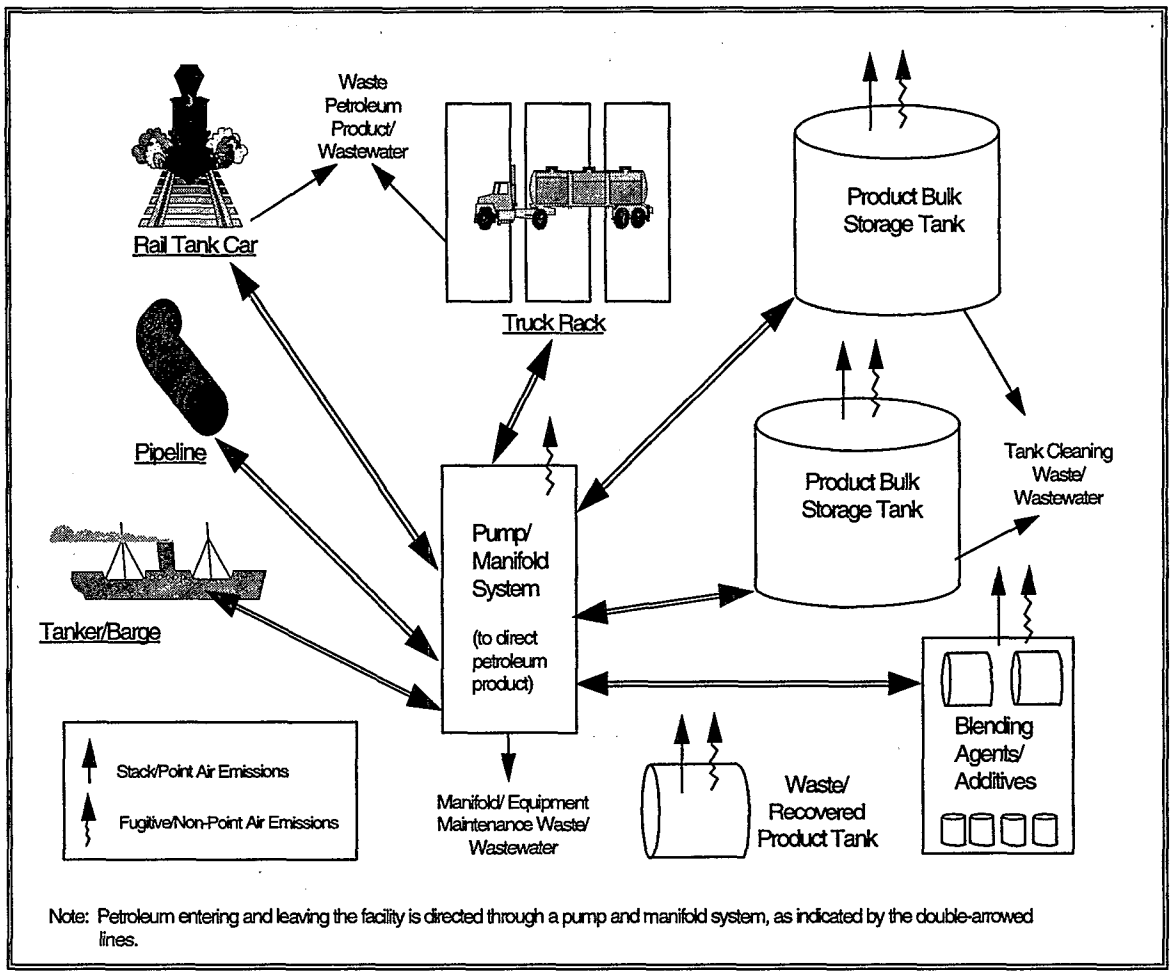

Figure 4-3 Process Flow Diagram at Petroleum Terminals and Bulk Storage Facilities

4.2.1 Fugitive Air Emissions, Section 5.1 of Form R

Fugitive air emissions can occur from a number of sources. The primary fugitive emissions sources for EPCRA Section 313 chemicals at petroleum bulk storage facilities are likely to be:

- Loading/unloading and transfer of petroleum products containing EPCRA Section 313 chemicals;
- Blending and mixing of petroleum products containing EPCRA Section 313 chemicals;
- Wastewater treatment and other sources, including tank cleaning operations, spills, and tank overfills, containing EPCRA Section 313 chemicals.

Loading and unloading and transfer of petroleum products. Loading losses occur as organic vapors in "empty" cargo tanks are displaced to the atmosphere by the liquid being loaded into the tanks. These vapors are composed of vapors formed in the empty tank by evaporation of residual product from previous loads, vapors transferred to the tank as product is being unloaded, and vapors generated in the tank as the new product is being loaded. The quantity of evaporative losses from loading operations depends on parameters such as the physical and chemical characteristics of the previous and new cargo and the method of loading and unloading.

Releases

Tank trucks and rail cars physically enter a facility. While loading for transport, emissions of EPCRA Section 313 chemicals may occur. Are these emissions subject to reporting under EPCRA Section 313?

Yes, because the loading and the releases occur within the facility boundary, the releases must be reported if the facility meets activity threshold for the EPCRA Section 313 chemical, employee, and SIC code criteria.

The use of vapor recovery equipment can reduce loading emissions. Vapor recovery equipment captures organic vapors that are displaced during loading operations and either pipes the recovered product to a storage unit or to a thermal oxidation unit where the vapor is combusted. Chapter Five, Section Two, of *Compilation of Air Pollutant Emission Factors (AP-42)* and Section Three of *Estimating Releases and Waste Treatment Efficiencies For the Toxic Chemical Release Inventory Form* (EPA 560/4-88-002, December 1987) provide detail information on the calculation of total VOC vapor emissions during the transportation and marketing of petroleum liquids.

Fugitive emissions may occur during the loading, unloading, and transfer of petroleum products containing EPCRA Section 313 chemicals. Concentrations of EPCRA Section 313 chemicals in these petroleum products will greatly affect the need to determine if fugitive emissions will have to be calculated for handling activities during use of these products. Table 3-4 lists a number of EPCRA Section 313 chemicals that may be present in various petroleum products and the estimated concentration values of the constituents. If the facility does not have any specific information of the content of EPCRA Section 313 in the petroleum product, Table 3-4 may be used to estimate concentration values of constituents. During the processing and otherwise use of petroleum products, EPCRA Section 313 chemicals below *de minimis* levels do not have to be considered toward threshold determination or release or other waste management calculations. Petroleum products may have EPCRA Section 313 chemicals above *de minimis* levels and facilities should consider fugitive emissions resulting from the handling and storage of these products. EPA's *Protocol For Equipment Leak Emission Estimates* (EPA-453/R-95-017) presents a comprehensive discussion of how to estimate equipment leaks, such as those from valves, seals, and connectors in fuel handling equipment. This document is available at http://www.epa.gov/ttnchie1/fyi.html. Four approaches for estimating equipment leak emissions, in order of increasing refinement, are presented:

- Average emission factor approach;
- Screening ranges approach;
- EPA correlation approach; and

- Unit-specific correlation approach.

In general, the more refined approaches require more data and provide more accurate emission estimates for a process unit. Also, it is important to recognize in calculating estimates for these sources, you may have already calculated these estimates as a result of separate requirements under the Clean Air Act, particularly the Title V requirements.

In the average emission factor approach and the screening ranges approach, emission factors are combined with equipment counts to estimate emissions. EPA has also developed emission factors for the synthetic organic chemical manufacturing industry (SOCMI), refineries, oil and gas production units, and petroleum marketing terminals. The SOCMI emission factors are presented in Table 4-4. These average factors must be multiplied by the number of pieces of equipment being considered and the length of time each piece of equipment is in service. The average emission factors vary depending on the service category (e.g., gas, light liquid, or heavy liquid), and the total organic compound (TOC) concentration of the stream. To estimate emissions with the EPA correlation approach, measured concentrations (screening values) for all equipment are individually entered into general correlations developed by the EPA. In the unit-specific correlation approach, screening and leak rate data are measured for a select set of individual equipment components and used to develop unit-specific correlations. Screening values for all components are then entered into these unit-specific correlations to estimate emissions.

The general equation for estimating TOC mass emissions from an equipment leak using average emission factors is:

$$E_{TOC} = F_A * WF_{TOC} * N$$

where:

E_{TOC} = emission range of TOC from all equipment in the stream of a given equipment type (lb/hr)
F_A = average emission factor for the equipment type (lb/hr/source)
WF_{TOC} = average weight fraction of TOC in the stream
N = number of pieces of equipment

And the equation for determining the emissions of a specific VOC in a mixture or other trade name product from equipment is:

$$E_x = E_{TOC} * (WP_x/WP_{TOC})$$

where:

E_x = The mass emissions of organic chemical "x" (lb/hr)
E_{TOC} = The TOC mass emissions from the equipment (lb/hr)
WP_x = The concentration of organic chemical "x" in the equipment in weight percent
WP_{TOC} = The TOC concentration in the equipment in weight percent.

Table 4-4
SOCMI AVERAGE EMISSION FACTORS*

Equipment type	Service	Emission factors[a] (lbs/hr/source)
Valves	Gas Light liquid Heavy liquid	0.0132 0.00888 0.00051
Pump seals[b]	Light liquid Heavy liquid	0.0439 0.0190
Compressor seals	Gas	0.503
Pressure relief valves	Gas	0.229
Connectors	All	0.00403
Open-ended lines	All	0.0037
Sampling connections	All	0.0331

**Protocol for Equipment Leak Emission Estimates* (EPA, EPA-453/R-95-017)
a These factors are for total organic compound emissions
b The light liquid pump seal factor can be used to estimate the leak rate from agitator seals

Calculation of Equipment Leak Emissions

At a petroleum bulk storage facility, aviation gasoline passes through a system containing 100 connectors from the storage tank area to the loading/unloading area. The aviation gasoline contains 85 weight percent TOC. The aviation gasoline is in contact with the connectors in the system for 8,000 hours during the year. The weight percent of toluene in the waste is 5.6% based on the facility's data. The emissions of TOC would be calculated as:

E_{TOC} = F_A * WF_{TOC} * N * (Number of hours in contact during the year)
= (0.00403 lb/hr/connector) (0.85) (100) (8000 hrs/year)
= 2,740 lb/year of TOC from connectors

The emissions of toluene from the connectors would be calculated as:

E_x = E_{TOC} * (WP_x/WP_{TOC})
= 2,740 lb/year * (0.056/0.85)
= 181 lb/year of toluene from connectors

This average emission factor approach is presented as an option for facilities with no data concerning equipment leaks. As with all estimated derived for compliance with EPCRA Section 313, it is the facility's responsibility to choose the best method for estimating releases from equipment leaks.

Blending and mixing of petroleum products. Facilities may generate fugitive emissions during the blending and mixing of petroleum products with additives and catalysts prior to further distribution in commerce. The blending and mixing operations in most petroleum bulk storage facilities consist of enclosed systems which are vented through control devices. Therefore, the fugitive particulate matter emissions from these systems are anticipated to be minimal. You should review "readily available data" at your facility to identify where fugitive emissions may occur and to what extent those emissions can be quantified. For example, you may have permit requirements in regard to particulate matter emissions and, as part of these permits, may have facility-specific or other emission factors for particulate matter released. Estimates for fugitive emissions may be derived by combining these data with data on the measured or default concentrations of constituents in the petroleum products and additives, along with annual throughput data. In particular, it may be useful to review your permit applications which may contain more detailed analyses of the potential for fugitive air emissions related to blending and mixing activities and, in some cases, may contain actual monitoring data or facility-derived emission factors. Facilities that do not have such data may use other sources, including engineering judgement to estimate fugitive emissions. Keep in mind that for estimates below 1,000 pounds, facilities can use the range codes provided in the *TRI Forms and Instructions* for reporting information in Sections 5 and 6 of the Form R, particularly if the estimate is not believed to be very accurate.

Potential Errors - Reporting

The most common reporting error in catalyst usage is basing the threshold determination on the total amount of the chemical in the processing system. Similar to refrigerant chemicals, the throughput to be used for a threshold determination is only the amount of new chemical added to the system during the year. Therefore, the processing system may contain more than 10,000 pounds of catalyst, but an EPCRA Section 313 report is not required unless more than 10,000 pounds of new catalyst is added to the system during the year. The quantities of catalyst added during the year can best be determined from purchase and

Wastewater Treatment and other sources. Fugitive air emissions of volatile EPCRA Section 313 chemicals from wastewater treatment units (e.g., oil/water separators) could be estimated using one of several programs. Volatile chemicals can evaporate from solid waste (e.g., sludge) and non-volatile chemicals can be released to the air via particulate emissions. One tool that can be used to estimate emissions in these situations is CHEMDAT8 (See box.) Other programs are available commercially.

CHEMDAT8

Analytical models have been developed to estimate emissions of organic compounds via various pathways from wastewater and waste management units. Some of these models have been assembled into a spreadsheet called CHEMDAT8 for use on a PC. A user's guide for CHEMDAT8 is also available. Area emission sources for which models are included in the spreadsheet are as follows: nonaerated impoundments, which include surface impoundments and open top wastewater treatment tanks; aerated impoundments, which include aerated surface impoundments and aerated WWT tanks; disposal impoundments, which include nonaerated disposal impoundments; land treatment; and landfills. These models can be used to estimate the magnitude of site air emissions for regulatory purposes. The CHEMDAT8 program and manual can be downloaded from the world wide web at: http://www.epa.gov/ttn/chief/software.html#water8.

Transfer and treatment operations will result in fugitive air emissions, but waste previously disposed of in landfills or surface impoundments will also generate emissions. These emissions need to be considered in your release calculations as well during the year that they were disposed. These emissions will be dependent on the types and quantities of wastes placed in the landfill or surface impoundments as well as the design and operating practices of the landfill.

WATER8

A computer program, WATER8, is available for estimating the fate of organic compounds in various wastewater treatment units, including collection systems, aerated basins, and other units. WATER8 is written to run under DOS without the need to purchase other programs. WATER8 contains useful features such as the ability to link treatment units to form a treatment system, the ability to recycle among units, and the ability to generate and save site-specific compound properties. The WATER8 program and users manual can be downloaded from the world wide web at: http://www.epa.gov/ttn/chief/software.html#water8

Other Sources - Equipment, Storage, Spills, Leaks, Cleaning, etc. Fugitive air releases of EPCRA Section 313 chemicals can occur from equipment in use, leaks in valves and fittings, losses during cylinder changeovers, tank cleanings, loading/unloading spills, overfills of storage tanks, and periodic process-related cleaning operations. For small quantities of EPCRA Section 313 chemicals otherwise used, engineering judgment can be used to estimate fugitive releases (e.g., based on the volume of the storage tank and the number of changeovers). If significant quantities of chemicals are handled, fugitive releases can be estimated using the emission factors discussed previously in regards to the use of petroleum products.

Secondary containment of the storage tanks and loading racks may collect rainwater runoff contaminated with petroleum and other constituents from equipment cleaning operations, leaks, and spills. The composition of this waste is highly variable. Fugitive emissions may occur from wastewater that is accumulated on site in secondary containment, sumps, or impoundments. Programs such as WATER8 or CHEMDAT8 can aid in determining fugitive emissions from these units.

Releases From Transportation Vehicles

A facility is responsible for reporting releases and other waste management activities for an EPCRA Section 313 chemical that occur during loading or unloading of a transportation vehicle provided an activity threshold has been exceeded for that chemical. Releases of an EPCRA Section 313 chemical from a transportation vehicle that occur while the material is still under "active shipping papers" is considered to be in transportation and is not subject to EPCRA Section 313 requirements (EPCRA Section 327). For example, a facility shipping gasoline containing toluene for further distribution in commerce is not responsible for reporting releases once the shipping papers have been signed. The facility is responsible for reporting releases of EPCRA Section 313 chemicals, including those that occur during storage of the chemicals in the transportation vehicle while the vehicle is on property owned or operated by the facility, up until the point that the shipping papers have been signed.

4.2.2 Stack or Point Source Air Emissions, Section 5.2 of Form R.

Stack emissions of EPCRA Section 313 chemicals occur primarily from storage tanks, which is discussed below.

Storage Tanks. Petroleum bulk storage facilities should consider point source air emissions from tanks that store materials containing volatile chemicals such as Fuel oil No.2. *AP-42* provides detailed information on the calculation of air emissions during the storage and transfer of liquids. A number of equations used to calculate air emissions from storage tanks can be found in *AP-42*, Chapter 7. Total emissions from storage tanks are equal to the sum of the standing storage loss and working loss. Variables such as tank design, liquid temperature, and wind velocity are taken into account when determining standing storage loss and working loss. The emission equations for fixed-roof tanks in AP-42 were developed for vertical tanks; however, the equations can also be used for horizontal tanks by modifying the tank parameters as specified in AP-42. Many of these equations have been incorporated into computer models such as TANKS 3 (See box on TANKS 3 for more information).

TANKS 3

The TANKS 3 program is designed to estimate emissions of organic chemicals from several types of storage tanks. The calculations are performed according to EPA's AP-42, Chapter 7. After the user provides specific information concerning a storage tank and its liquid contents, the system produces a report which estimates the chemical emissions for the tank on an annual or partial year basis. The user can also determine individual component losses by using one of the specification options available in the program.

The TANKS 3 program relies on a chemical database of over 100 organic liquids and a meteorological database which includes over 250 cities in the United States; users may add new chemicals and cities to these databases by providing specific information through system utilities. On-line help provides documentation and user assistance for each screen of the program. The TANKS 3 program and manual can be downloaded from the world wide web at http://www.epa.gov/ttn/chief/tanks.html.

Once the total volatile organic compound (VOC) loss is calculated, you can then determine the emission rate of each constituent in the vapor. In general, the emission rate for individual components can be estimated by multiplying the weight fraction of the constituent in the vapor by the amount of total VOC loss. The weight fraction of the constituent in the vapor can be calculated using the mole fraction and the vapor pressure of the constituent (equations found in AP-42). The weight percent can also be obtained from the SPECIATE database. The SPECIATE data base contains organic compound and particulate matter speciation profiles for more than 300 source types. The profiles attempt to break down the total VOC or

Use of AP-42 Emission Factors

The general equation for emission estimation is:

$$E = A \times EF \times (1-ER/100)$$

where:

E = emissions,
A = activity rate,
EF = emission factor, and
ER= overall emission reduction efficiency, %.

ER is further defined as the product of the control device destruction or removal efficiency and the capture efficiency of the control system. When estimating emissions for a long time period (e. g., one year), both the device and the capture efficiency terms should account for upset periods as well as routine operations. Note that some emission factors already incorporate a removal efficiency term.

particulate emissions from a particular source into the individual compounds. The SPECIATE database can be downloaded from the world wide web at http://www.epa.gov/ttn/chief/software.html#speciate.

Air Emissions

For estimating air emissions of specific chemicals from floating roof tanks that contain *mixtures*, how does one calculate the average vapor molecular weight and true vapor pressure to use in *AP-42* equations? Does one calculate emissions for the *mixture* then adjust by weight percentage later or vice versa?

Calculate emissions of the *mixture* then adjust for concentration. Convert chemical fractions from weight to mole, calculate the *mixture*'s true vapor pressure, calculate the chemical's gas mole fraction, calculate the average vapor molecular weight, and use storage tank equations to calculate *mixture* emissions. Then calculate the gaseous weight fraction and multiply by total *mixture* emissions to get each chemical's emissions. Facilities may choose to refer to EPA's technical guidance entitled "Estimating Releases and Waste Treatment Efficiencies" (EPA 560/4-88-002)

4.2.3 Discharges to Receiving Streams or Water Bodies, Section 5.3 of Form R; and Discharges to Publicly Owned Treatment Works (POTWs), Section 6.1 of Form R

Wastewaters discharged include process wastewater, secondary containment wastewater, and storm water. Each is discussed below.

Process Wastewater. Facilities may discharge wastewater resulting from various on-site operations. The main source of process wastewater is usually storage tank clean-out water. During cleaning operations, the tanks are drained down to remove and recover product. Residue from this operation consists of a liquid and a solid phase. The liquid is primarily wastewater with small amounts of hydrocarbons including benzene, cyclohexane, ethylbenzene, toluene, 1,2,4-Trimethylbenzene, and xylene. The wastewater from the tank is either drained and discharged or is directed to a tank for subsequent fuel recovery. In addition, Section 313 chemicals in wastewater discharges related to spills also should be reported.

A facility that discharges or has the potential to discharge water containing regulated wastes must operate under the terms of Federal, State, and/or local permits, such as a NPDES direct discharge permit, or a POTW indirect discharge agreement. The permit(s) or agreement usually require measurements of the water volume and monitoring of some generalized wastewater parameters including concentrations of various constituents. In some cases, the constituent analyses required for permit compliance includes EPCRA Section 313 chemicals. In other cases, facilities may have conducted more detailed analysis of specific constituents in its wastewaters as part of its NPDES or POTW discharge applications. In these instances, releases can be calculated by multiplying the volume of wastewater released by the concentration of the chemical released. See box for an example calculation.

Based on the concentration and wastewater flow data available, an estimate of discharges to water can be calculated. Facilities should calculate the daily average discharges of a reportable EPCRA Section 313 chemical in pounds and must use those estimates to determine the annual discharge in pounds per year. Using the daily concentration data available for the reportable

chemical combined with the wastewater flow data for each of the sampling dates, calculate an estimate of pounds per day for each sampling date. After the calculations are made for each monitoring point (e.g., daily, monthly), the pounds discharged are averaged to determine an average daily discharge amount which would be multiplied by the number of days discharges were possible (e.g., 365 days a year). If no chemical-specific monitoring data exist, process knowledge (or in some cases, mass balance) may be used to develop an estimate.

Discharges of listed acids may be reported as zero if all discharges have been neutralized to pH 6 or above. If wastewater containing a listed acid is discharged below pH 6, then releases of the acid must be calculated and reported except for hydrochloric and sulfuric acid, which are only reportable in the aerosol form. For more information on calculating such discharges of acids, see EPA's *Estimating Releases of Mineral Acid Discharges Using pH Measurements* (EPA 745/F-97-003, June 1991).

Example Calculation of Yearly Wastewater Discharge

A facility has monitoring data on discharges to water of xylene, a EPCRA Section 313 chemical, and a Form R report is required. In this example, monitoring data on this chemical are only available for two days in the year. The daily quantities of pounds of xylene released for those two dates would then be divided by the number of sample dates to determine the daily average for the whole reporting year, which would be used to estimate the annual discharge of xylene in wastewater:

Date	Concentration (mg/l)	Flow (MGD)	Daily Discharge
3/1	1.0	1.0	8.33 lbs.
9/8	0.2	0.2	0.332 lbs.

Annual Calculation:
(8.33 lbs. + 0.332 lbs.)/2 days x 365 days/year = 1580.82 lbs/yr

No releases to water of chlorine are typically expected. Chlorine reacts very quickly with water to form HOC1, $C1^-$, and H^+. Although this is an equilibrium reaction; at a pH above 4, the equilibrium shifts almost completely toward formation of these products. Therefore, essentially zero releases of chlorine to water are expected to occur under normal circumstances.

Reminder: Reporting of Aqueous Ammonia

Facilities may use ammonia or ammoniated cleaners. When reporting releases and other waste management activities of ammonia, remember to report only 10 percent of the total amount of ammonia if released or managed in aqueous form.

Secondary Containment Wastewater. Precipitation often accumulates in the secondary containment of the storage tanks and loading/unloading area and must be drained as often as necessary depending on the weather. This wastewater also may be drained to water ditches or oil/water separators. Reportable EPCRA Section 313 chemicals present in secondary containment wastewater should be monitored and reported.

Storm Water Runoff. Storm water runoff at petroleum bulk storage facilities may contain EPCRA Section 313 chemicals washed from materials such as petroleum products or other raw materials, waste, and land features. You must report the amount of non-exempt EPCRA Section 313 chemicals in storm water runoff (including unchanneled runoff) if you monitor for releases of reportable EPCRA Section 313 chemicals. If you do not have periodic measurements of storm water releases, but have chemical-specific monitoring data on the reportable EPCRA Section 313 chemicals, you must use these data to calculate the quantity discharged and the percent contribution from storm water to the overall water discharge estimate. See the current *TRI Forms and Instructions* document for guidance on calculating storm water runoff.

Example - Storm Water Runoff

A facility is located in a semi-arid region of the United States which has annual precipitation (including snowfall) of 12 inches of rain. (Snowfall should be converted to the equivalent inches of rain; assume one foot of snow is equivalent to one inch of rain.) The total area covered by the facility is 42 acres (about 170,000 square meters or 1,829,520 square feet) of which 50 percent is unimproved area, 10 percent is asphaltic streets, and 40 percent is concrete pavement.

The total Storm water runoff from the facility is therefore calculated as follows:

Land Use	% Total Area	Runoff Coefficient
Unimproved area	50	0.20
Asphaltic streets	10	0.85
Concrete pavement	40	0.90

Weighted runoff coefficient = (50%) x (0.20) + (10%) x (0.85) + (40%) x (0.90) = 0.545

(Rainfall) x (land area) x (conversion factor) x (runoff coefficient) = Storm water runoff

(1 foot) x (1,829,520 ft^2) x (7.48 gal/ft^3) x (0.545) = 7,458,220 gallons/year

Total storm water runoff = 7.46 million gallons/year

The storm water monitoring data shows that the average concentration of toluene in the storm water runoff from a facility is 1.0 milligrams per liter. The total amount of toluene discharged to surface water through the plant wastewater discharge (non-storm water) is 250 pounds per year. The total amount of toluene discharged with storm water is:

(7,458,220 gallons Storm water) x (3.785 liters/gallon) = 28,229,360 liters Storm water

(28,229,360 liters Storm water) x (1 mg. toluene/liter) x (1×10^{-6}) = 28.2 kg toluene= 62 pounds toluene.

The total amount of toluene discharged from all sources at this facility is:

250 pounds toluene from wastewater discharged
+62 pounds toluene from storm water runoff
312 pounds toluene total water discharged

312 pounds of toluene is reported in Section 5.3.A on Form R

The percentage of toluene discharge through storm water reported in Section 5.3.C on Form is:

62 ÷ 312 x 100 = 20%

4.2.4 Disposal to Land On-site, Section 5.5 of Form R

Facilities may dispose of tank residue wastes on site. Accidental releases can also lead to EPCRA Section 313 chemicals being disposed to land on site. Each of these is discussed below.

Tank Residue Wastes. Petroleum bulk storage facilities may dispose of tank residue waste containing EPCRA Section 313 chemicals in on-site landfills, surface impoundments, or

other waste management units. Facility specific information, such as waste analyses and process knowledge, can be used to estimate amounts of EPCRA Section 313 chemicals in tank residue wastes.

Other Wastes. Petroleum bulk storage facilities may also dispose of other wastes such as spill residues, solids from petroleum product filtration, and settled materials from storage tanks. To calculate quantities of EPCRA Section 313 chemicals that may be present in these wastes, facilities can use waste analyses, process knowledge, operating records, pollution prevention data, mass balance or other "readily available data" sources.

Example - Wastes Stored on Concrete Pads

Are EPCRA Section 313 chemicals in waste stored on a concrete pad outside considered a release?

Waste stored on a concrete pad must be counted as a release to land if the facility intends to leave the material on the pad for an indefinite period. If the facility routinely uses the pad for "temporary" storage of waste until enough waste is accumulated and then sends the waste off-site for treatment or disposal purposes, or otherwise manages the waste on-site, then the "temporary" storage need not be reported as a release to land within the reporting year when it is "temporarily stored" and only those amounts of the EPCRA Section 313 chemical released from the pad, such as runoff, would be reported as released, provided thresholds have been exceeded elsewhere at the facility.

Note that you must report the ultimate known disposition of an EPCRA Section 313 chemical in the reporting year. In other words, you may need to consider any cross-media transfers that may result from land disposal. If a waste has been disposed in a land disposal unit, but a portion of that waste volatilizes into the air, or a portion of that waste discharges to a surface water, the ultimate disposition of the reportable EPCRA Section 313 chemical during the reporting year must be reported for the year in which the waste was disposed. Therefore, only the quantity that remains in surface impoundment or other land disposal unit must be reported as a release to land.

Example - Seepage From a Landfill

If a facility in one of the new industries, which begins reporting for activities conducted in 1998, has information on the amount of seepage from a landfill in 1998, do they report this amount as a release to land, since they were not required to report the initial disposal to land in the previous year?

No, facilities are required to report only the amounts which are disposed during the year in which they are disposed, provided certain thresholds have been meet and the facility does not conduct any further activities involving amounts previously disposed. Amounts which move within the same media, such as seepage from a landfill to surrounding soils do not have to be included in release estimates in subsequent years. EPA requires reporting of the amount of EPCRA Section 313 chemical placed in an on-site landfill during the year. It is not necessary to estimate migration from the landfill in subsequent years, provided the facility does not conduct activities that further involve the EPCRA Section 313 chemical disposed.

Accidental Releases to Land. Leaks, spills, and drips from the loading and transfer of petroleum products and other materials received at the facility should be considered and reported in your release estimates. Data concerning specific incidents (such as notification reports or incident logs) should be used to

estimate releases. In calculating quantities related to accidental releases, you are required to report the ultimate disposition in the reporting year that the EPCRA Section 313 chemical(s) are released. For instance, releases to land (e.g., Other Disposal, Section 5.5.4 of Form R), would only include the quantity of spilled material that was not cleaned up as a response to the accident.

Equations found in Section 6 of EPA's *Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form,* provide guidance on calculating releases from chemical spills or leaks, including liquid discharges, fraction of discharge flashed, vaporization, two-phase discharges, and gas discharges.

4.2.5 Transfers Off-site, Section 6.2 of Form R.

Petroleum bulk storage facilities may send wastes off-site for waste management. Most commonly, wastes will be sent off-site for disposal and recycling. Facilities must report the quantities of EPCRA Section 313 chemicals in these wastes in Sections 6.2 and 8 of Form R. These amounts are reportable whether they are sent to a facility within the same company, or from a different company. For example, if a petroleum bulk storage facility sends sludge to a landfill owned by the same company that is on non-contiguous, non-adjacent property (i.e., a separate facility), then the petroleum bulk storage facility must report those amounts as transferred off-site if the ultimate disposition in the reporting year is for disposal.

The same methods discussed previously for estimating quantities disposed on-site can be used to estimate amounts sent off-site for disposal. Wastes sent off-site that are regulated under RCRA Subtitle C will also have waste analyses and waste profiles.

Waste Management Codes for Metals

Metals and metal compounds in wastewater sent off-site for treatment should be reported using code M62 - "Wastewater Treatment (Excluding POTW) - Metals and Metal Compounds Only". Similarly, metals in solids sent off-site for solidification or stabilization should be reported using code M41 - "Solidification/Stabilization - Metals and Metal Compounds Only". These codes are considered disposal codes for EPCRA Section 313 reporting purposes.

4.2.6 On-site Waste Management Methods, Section 7A, 7B, and 7C of Form R

On-site waste management at petroleum bulk storage facilities includes treatment and recycling. Energy recovery of wastes is usually not performed at petroleum bulk storage facilities.

On-site Treatment Methods, Section 7A of Form R. Petroleum bulk storage facilities may treat wastes on-site using various methods. When completing a Form R for a chemical, you must report all treatment methods performed on the waste containing that chemical, regardless of its efficiency. For each treatment method, report the applicable code given in the *TRI Forms and Instructions* document. The following are some examples of treatment methods that petroleum bulk storage facilities may use:

- Sludge and other solid wastes may pass through several steps, including filtration (P12), sludge dewatering (P13), settling/clarification (P11), and thermal drying/dewatering (F83).

- Wastewater (such as oil and water, tank clean-out wastewater, etc.) may go through several treatment steps, including neutralization (C11), settling/clarification (P11), filtration (P12), chemical precipitation - lime or sodium hydroxide (C01), sludge dewatering - non-thermal (P13), or other physical treatment (e.g., evaporation) (P99).

For metal compounds, the calculation of the reportable concentration and waste treatment efficiency must be based on the weight of the parent metal, not on the weight of the metal compounds. Metals are not destroyed, only physically removed or chemically converted from one form into another. The waste treatment efficiency reported must represent only physical removal of the parent metal from the waste stream (except for incineration), not the percent chemical conversion of the metal compound. If a listed waste treatment method converts but does not remove a metal (e.g., chromium reduction), the method must be reported with a waste treatment efficiency of zero.

All data available at your facility must be used to calculate waste treatment efficiency and the influent concentration of the EPCRA Section 313 chemical. If data are lacking, estimates can be made using best engineering judgement or other methods.

On-site Recycling Processes, Section 7C. Section 313 chemicals in petroleum products that has spilled or leaked into the containment area or at the loading/unloading area may be reported in Section 7C if recovered and reinserted into the product tank. Reportable Section 313 chemicals present in wastewater and tank sludge residue that is sent through a fuel recovery system also is reported in Section 7C.

4.2.7 Source Reduction and Recycling Activities, Section 8

Earlier in this chapter, the general method for developing Section 8 quantities was discussed (See Chapter 4.1.3). An overview of Section 8 quantities are presented below:

Table 4-5
Examples of Section 8 Reporting

Section	Petroleum Products
Section 8.1, Quantity released	Fugitive and stack air emissions, releases to water and POTW, and off-site waste transfers for disposal
Section 8.2, Quantity used for energy recovery on-site	Not generally performed at petroleum bulk storage facilities
Section 8.3, Quantity used for energy recovery off-site	Off-site waste transfers with energy recovery codes
Section 8.4, Quantity recycled on-site	On-site wastes recovered and recycled in fuel recovery system
Section 8.5, Quantity recycled off-site	Off-site waste transfers with recycling codes
Section 8.6, Quantity treated on-site	On-site wastes recovered and treated
Section 8.7, Quantity treated off-site	Off-site waste transfers with treatment codes

4.2.8 Source Reduction Activities, Section 8.10

Facilities have the opportunity to report source reduction actions initiated during the reporting year on the Form R using codes listed in the Form R and Instructions. Some examples of source reduction activities and suggested codes are given below.

- Reducing the frequency of tank cleanings and, therefore, the amount of tank cleaning wastes by tracking process chemistry and monitoring tank cleanliness to determine more precisely the need for cleaning. (W13: Improved maintenance scheduling, recordkeeping, or procedures)

- Reducing the frequency of tank cleanings and the amount of tank cleaning wastes by applying a protective coating to the surfaces internal heater coils to prevent accumulation of scale on coil surfaces. (W52: Modified equipment, layout or piping)

- Reducing the need for corrosion inhibitors on buried piping by using cathodic protection. (W52: Modified equipment, layout or piping)

APPENDIX A
REPORTING GUIDANCE DOCUMENTS

General Guidance

Air/Superfund National Technology Guidance Study Series, no date.
Internet Availability: None
Hardcopy Availability: NTIS
Order Number: PB96-162-490

Chemicals in Your Community: A Guide to the Emergency Planning and Community Right-To-Know Act, 1993.
Internet Availability: http://www.epa.gov/swercepp/gen-pubs.html
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-550-K-93-003

Common Synonyms for Chemicals Listed Under Section 313 of the Emergency Planning and Community Right-To-Know Act, March 1995.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-008

Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act and Section 112(r) of the Clean Air Act, as amended (Title III List of Lists), November 1998.
Internet Availability: http://www.epa.gov/swercepp/gen-pubs.html
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-550-B-98-017

The Emergency Planning and Community Right-to-Know Act: Section 313 Release Reporting Requirements, December 1997 (brochure).
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-K-97-002

EPCRA Section 313 Questions & Answers, Revised 1998 Version, December 1998.
Internet Availability: http://www.epa.gov/opptintr/tri
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-B-99-004

Executive Order 12856 - Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements: Questions and Answers.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-011

Interpretations of Waste Management Activities: Recycling, Combustion for Energy Recovery, Treatment for Destruction, Waste Stabilization and Release, April 1997.
Internet Availability: None
Hardcopy Availability: EPCRA Hotline
Order Number: No order number

Standard Industrial Classification Manual, 1987.
Internet Availability: None (see http://www.epa.gov/tdbnrmrl/help/l_help7.htm for codes)
Hardcopy Availability: NTIS
Order Number: PB-87-100-012

Supplier Notification Requirements
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-560-4-91-006

Toxic Chemical Release Inventory Reporting Forms and Instructions (TRI Forms and Reporting Requirements), March 23, 1998
Internet Availability: http://www.epa.gov/opptintr/tri
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-K-98-001

Toxic Chemical Release Reporting; Community Right-to-Know; Final Rule, February 16, 1988 (53 FR 4500).
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: None

Trade Secrets Rule and Form, July 29, 1988 (53 FR 28772).
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: None

Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes; A Guidance Manual, April 26, 1994.
Internet Availability: http://es.epa.gov/oeca/ore/red/wap330.pdf
Hardcopy Availability: NTIS
Order Number: PB94-963-603

Chemical-Specific Guidance

Emergency Planning and Community Right-to-Know Section 313: Guidance for Reporting Aqueous Ammonia, July 1995.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-012

Emergency Planning and Community Right-to-Know Section 313: List of Toxic Chemicals Within the Chlorophenols Category, November 1994.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-B-95-004

Emergency Planning and Community Right-to-Know Section 313: List of Toxic Chemicals, September 1996.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-B-96-002

Guidance for Reporting Sulfuric Acid Aerosols (acid aerosols, including mists, vapors, gas, fog, and other airborne forms of any particle size), March 1998 Revision
Internet Availability: http://www.epa.gov/opptintr/tri
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-97-007

List of Toxic Chemicals within the Water Dissociable Nitrate Compounds Category and Guidance for Reporting, May 1996.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-96-004

Toxics Release Inventory: List of Toxic Chemicals Within the Glycol Ethers Category and Guidance for Reporting, May 1995.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-006

Toxics Release Inventory: List of Toxic Chemicals Within the Nicotine and Salts Category and Guidance for Reporting, February 1995.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-004

Toxics Release Inventory: List of Toxic Chemicals Within the Polychlorinatd Alkanes Category and Guidance for Reporting, February 1995.

Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-001

Toxics Release Inventory: List of Toxic Chemicals Within the Polycyclic Aromatics Compounds Category, February 1995.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-003

Toxics Release Inventory: List of Toxic Chemicals Within the Strychnine and Salts Category and Guidance for Reporting, February 1995.
Internet Availability: None
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-95-005

Release Estimation Guidance

General

Data Quality Checks to Prevent Common Reporting Errors on Form R/Form A, August 1998.
Internet Availability: http://www.epa.gov/opptintr/tri
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-745-R-98-012

Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form, December 1987.
Internet Availability: http://www.epa.gov/opptintr/tri
Hardcopy Availability: NCEPI or EPCRA Hotline
Order Number: EPA-560-4-88-002

Releases During Cleaning of Equipment, June 30, 1986.
Internet Availability: None
Hardcopy Availability: Prepared by PEI Associates, Inc. for the U.S. Environmental Protection Agency, Office of Prevention, Pesticides & Toxic Substances, Washington, DC, Contract Bo.
Order Number: 68-02-4248

Air

Chemdat 8/Water 8: Air Emission Models for Waste and Wastewater (for Microcomputers), 1994
Internet Availability: http://www.epa.gov/ttn/chief/software.html#water8
Hardcopy Availability: NTIS
Order Number: PB95-503595

Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition (AP-42).
Internet Availability: http://www.epa.gov/ttn/chief/ap42.html
Hardcopy Availability: NCEPI
Order Number: EPA-450-AP-425ED

Protocol for Equipment Leak Emission Estimates, 1987.
Internet Availability: http://www.epa.gov/ttnchie1/fyi.html
Hardcopy Availability: NCEPI
Order Number: EPA-423-R-95-017

Tanks 3: Tanks: Storage Tank Emission Estimation Software, Version 3.0 (for Microcomputers), March 1996
Internet Availability: http://www.epa.gov/ttn/chief/tanks.html
Hardcopy Availability: NTIS
Order Number: PB97-500-755

Water

Chemdat 8/Water 8: Air Emission Models for Waste and Wastewater (for Microcomputers), 1994
Internet Availability: http://www.epa.gov/ttn/chief/software.html#water8
Hardcopy Availability: NTIS
Order Number: PB95-503595

Information and Document Distribution Centers

Enviroene Information Network
BBS modem: (703) 908-2092
User Support: (703) 908-2007
Internet Home Page: http://es.epa/gov/index.html

National Center for Environmental Publications and Information (NCEPI)
P.O. Box 42419
Cincinnati, OH 45242
(800) 490-9198
(513) 489-8695 (fax)
Internet Home Page: http://www.epa.gov/ncepihom/index.html

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22151
(800) 553-6847
(703) 605-6900 (fax)
Internet Home Page: http://www.ntis.gov

OPPT Pollution Prevention (P2)
Internet Home Page: http://www.epa.gov/opptintr/p2home/index.html

Pollution Prevention Information Clearinghouse (PPIC)
Mail Code 3404
401 M Street, SW
Washington, DC
(202) 260-1023
(202) 260-0178 (fax)

RCRA, Superfund & EPCRA Hotline
(800) 424-9346 (outside the Washington, DC Area)
(703) 412-9810 (inside the Washington, DC Area)
TDD: (800) 553-7672 (outside the Washington, DC Area)
(703) 412-3323 (inside the Washington, DC Area)

RTK-Net
1742 Connecticut Avenue, NW
Washington, DC 20009-1146
(202) 797-7200
Internet Home Page: http://www.rtknet.org

Technology Transfer Network (TTN)
(919) 541-5384 (Help Desk)
Internet Home Page: http://www.epa.gov/ttn

EPA Toxic Release Inventory General Information and Guidance
Internet Home Page: http://www.epa.gov/opptintr/tri

U.S. Government Printing Office (GPO)
(202) 512-1800
(202) 512-2250 (fax)
Internet Availability: http://www.gpo.gov

*For the latest list of industry-specific and other technical guidance documents, please refer to the latest version of the *Toxic Chemical Release Inventory Reporting Forms and Instructions, Appendix H.*